The Mine and Smelter Supply Company

General Supplies

DENVER · SALT LAKE CITY
EL PASO · NEW YORK

CATALOG No. 52

CONSEJO DE MINERIA

CATALOG No. 52

The Mine and Smelter Supply Company

GENERAL SUPPLIES

FOR

Mines, Mills, Smelters
Industrial Plants
Machine Shop

MASSCO SERVICE

Denver, Colorado
Salt Lake City, Utah
El Paso, Texas

General Offices, New York City

Cable Address for General Offices and U. S. A. Branches, "Minterply"

INTRODUCTORY

In the preparation of this book we have steadfastly kept in view as our objective the production of a practical aid to the buyers of the products listed therein, to the end that necessary information relating to these products might be readily obtained. It being obviously impossible to include within the limited scope of a single book all of the items required and which we are able to supply, we solicit your inquiries for items not shown herein, and assure that our large and experienced organization will serve you well. We take this opportunity to thank our customers for past favors, and we hope this book will make new friends for us among the many buyers of supplies.

THE MINE AND SMELTER SUPPLY CO.

Date, December 1, 1919.

Copyright 1919, R. R. Donnelley & Sons Co.

TERMS

ALL SALES AND CONTRACTS MADE BY US ARE EXPRESSLY SUBJECT TO THE FOLLOWING TERMS

Stenographical and clerical errors subject to correction.

Prices subject to change without notice.

Quotations, unless otherwise stated, are for immediate acceptance.

All agreements made contingent upon strikes, fires, accidents or causes beyond our control.

Our liability from all causes is limited to the value of the goods sold or furnished.

If goods are defective, we will not be responsible beyond the value of the defective piece at the factory.

We will not otherwise be responsible for any damages or expenses occasioned by defective goods.

Claims for shortage, or deductions for erroneous charges, must be presented within ten days of receipt of goods.

Boxing and cartage will be charged at cost.

RETURNED GOODS

Do not return goods without writing us first. When permission is obtained, carefully mark your name, town and state on outside of package. Write us the same day, enclosing express receipt or original freight bill of lading, and mention date of invoice on which goods were billed you. Observance of this suggestion will save you annoying delays and much correspondence.

When any goods are shipped to us to be repaired, they should be tagged with the full name and address of the owner.

CANCELLATION OF ORDERS

Orders cannot be contermanded without our consent; this especially applies to goods other than standard.

REGARDING ORDERS

Buyers located away from the railroads should be careful to specify to what point goods should be shippped and by what route, and should also give post-office address to which invoice should be mailed.

Full shipping instructions should be given in each order.

If reference is made to a previous order, the date of same should be given.

Where parties unknown to us desire goods shippped C.O.D., an amount sufficient to pay transportation charges should accompany order.

We use Western Union Telegraph Code (Universal Edition).

DESCRIPTIONS AND ILLUSTRATIONS

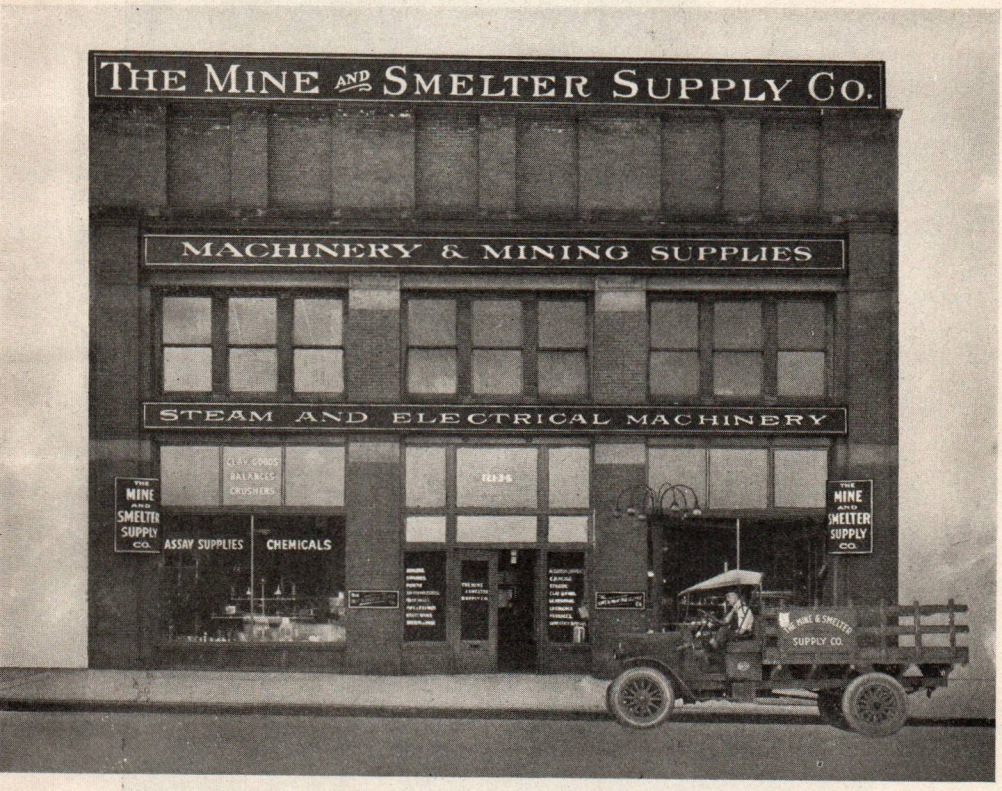
We reserve the right to make any changes in detail on our goods without reference to the descriptions and illustrations contained in this book, which may, in our opinion, develop an improvement or gain convenience for the purchaser.

SPECIAL NOTICE

Our goods are all packed securely by experienced men, and are shipped at the risk of the owner or consignee. We cannot be responsible for loss or damage after we take the railroad company's receipt. If goods arrive at destination damaged or in bad order, receipt should be given accordingly, so that recourse may be had on the transportation company.

We are not responsible for delays in delivery by transportation company.

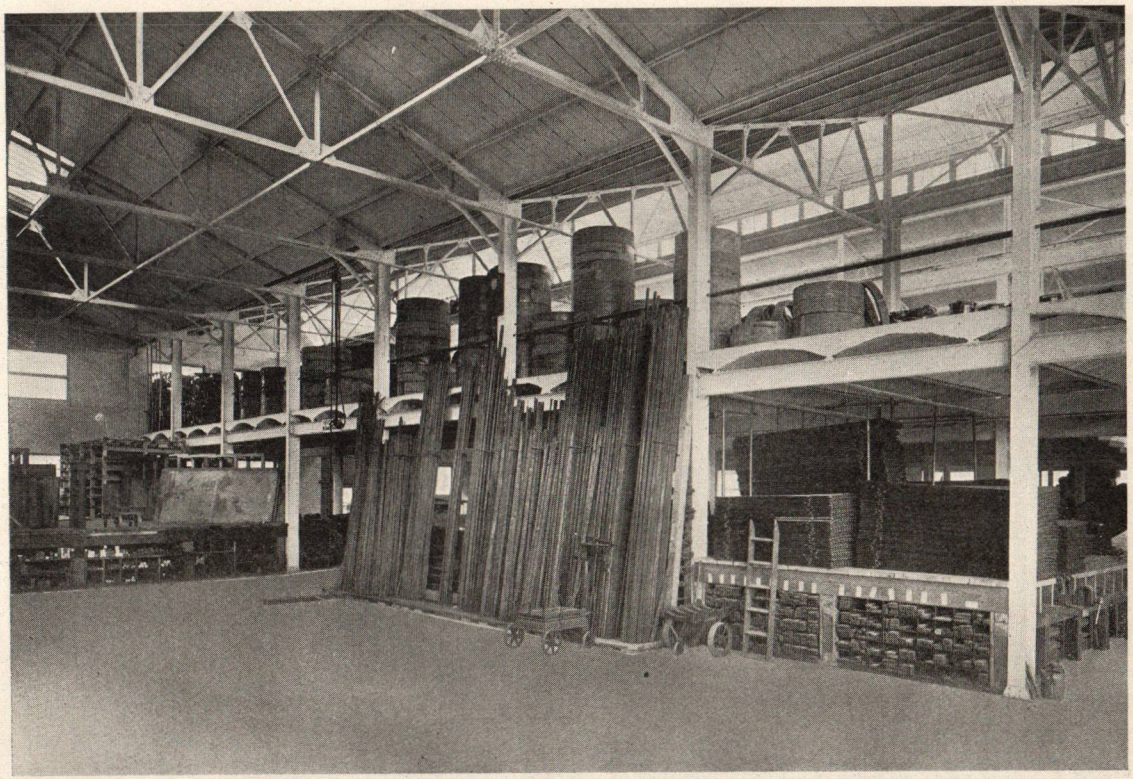
Corner 17th and Blake Streets, Denver, Colorado.



121 to 125 West Second South St., Salt Lake City, Utah

410 to 414 San Francisco St., El Paso, Texas

WAREHOUSES AT DENVER, COLORADO.

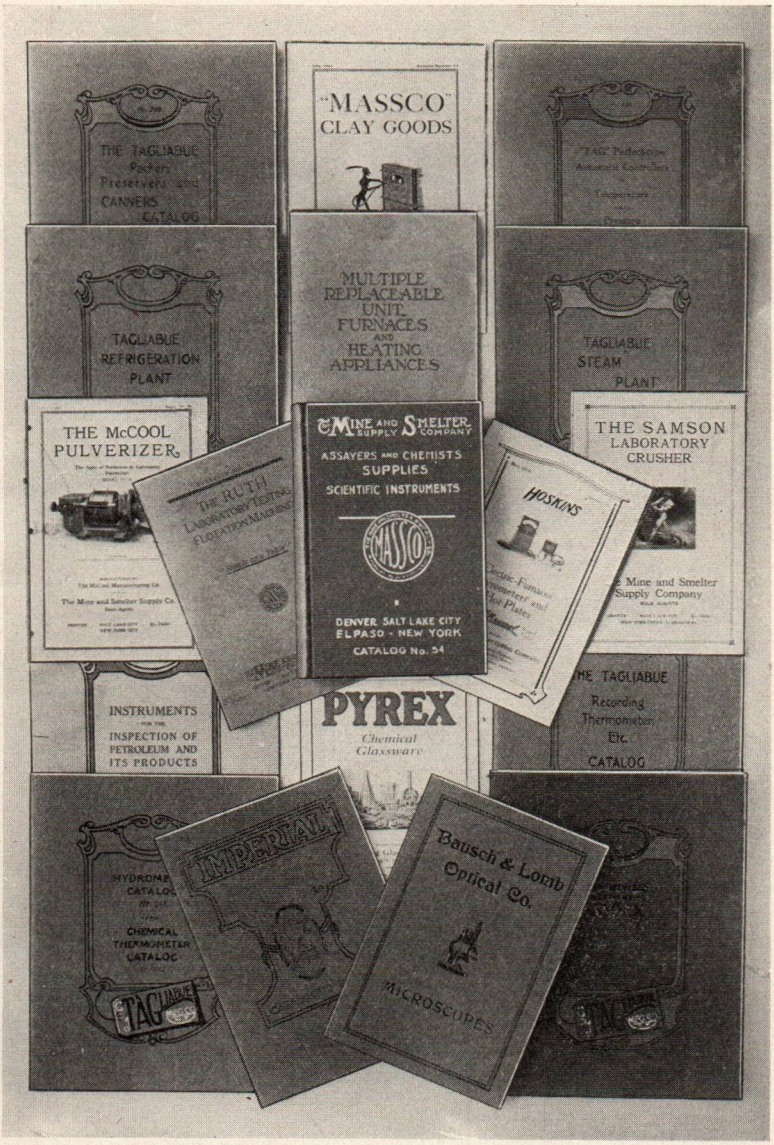


An Interior View in Our Warehouse

Pipe, Boiler Tubes, Bars, Shafting, Etc.

ILLUSTRATIONS OF CATALOGUES

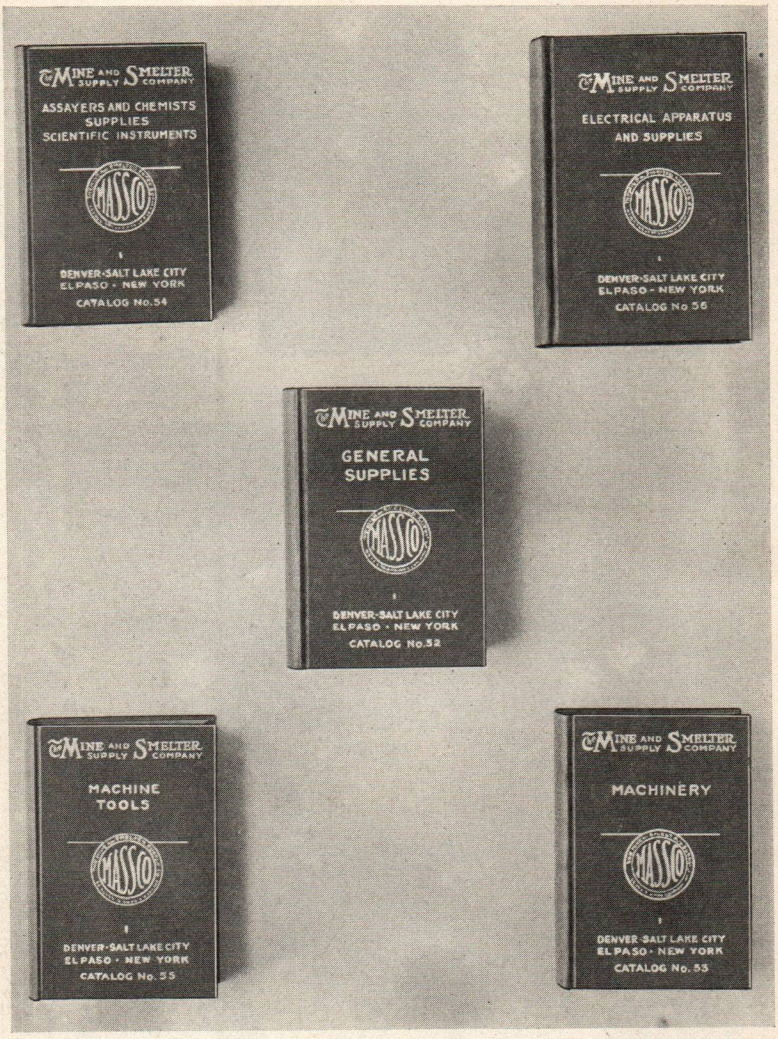
ILLUSTRATIONS OF CATALOGUES



ILLUSTRATIONS OF CATALOGUES

ILLUSTRATIONS OF CATALOGUES

ILLUSTRATIONS OF CATALOGUE



DOMESTIC PARCEL POST RATES

(IN EFFECT MARCH 15, 1918)

Weight Pounds	First Zone		2d Zone 50 to150 Miles Rate	3d Zone 150 to 300 Miles Rate	4th Zone 300 to 600 Miles Rate	5th Zone 600 to 1000 Miles Rate	6th Zone 1000 to 1400 Miles Rate	7th Zone 1400 to 1800 Miles Rate	8th Zone All Over 1800 Miles Rate
	Local Rate	Zone Rate 50 Miles							
1	.05	.05	.05	.06	.07	.08	.09	.11	.12
2	.06	.06	.06	.08	.11	.14	.17	.21	.24
3	.06	.07	.07	.10	.15	.20	.25	.31	.36
4	.07	.08	.08	.12	.19	.26	.33	.41	.48
5	.07	.09	.09	.14	.23	.32	.41	.51	.60
6	.08	.10	.10	.16	.27	.38	.49	.61	.72
7	.08	.11	.11	.18	.31	.44	.57	.71	.84
8	.09	.12	.12	.20	.35	.50	.65	.81	.96
9	.09	.13	.13	.22	.39	.56	.73	.91	1.08
10	.10	.14	.14	.24	.43	.62	.81	1.01	1.20
11	.10	.15	.15	.26	.47	.68	.89	1.11	1.32
12	.11	.16	.16	.28	.51	.74	.97	1.21	1.44
13	.11	.17	.17	.30	.55	.80	1.05	1.31	1.56
14	.12	.18	.18	.32	.59	.86	1.13	1.41	1.68
15	.12	.19	.19	.34	.63	.92	1.21	1.51	1.80
16	.13	.20	.20	.36	.67	.98	1.29	1.61	1.92
17	.13	.21	.21	.38	.71	1.04	1.37	1.71	2.04
18	.14	.22	.22	.40	.75	1.10	1.45	1.81	2.16
19	.14	.23	.23	.42	.79	1.16	1.53	1.91	2.28
20	.15	.24	.24	.44	.83	1.22	1.61	2.01	2.40
21	.15	.25	.25	.46	.87	1.28	1.69	2.11	2.52
22	.16	.26	.26	.48	.91	1.34	1.77	2.21	2.64
23	.16	.27	.27	.50	.95	1.40	1.85	2.31	2.76
24	.17	.28	.28	.52	.99	1.46	1.93	2.41	2.88
25	.17	.29	.29	.54	1.03	1.52	2.01	2.51	3.00
26	.18	.30	.30	.56	1.07	1.58	2.09	2.61	3.12
27	.18	.31	.31	.58	1.11	1.64	2.17	2.71	3.24
28	.19	.32	.32	.60	1.15	1.70	2.25	2.81	3.36
29	.19	.33	.33	.62	1.19	1.76	2.33	2.91	3.48
30	.20	.34	.34	.64	1.23	1.82	2.41	3.01	3.60
31	.20	.35	.35	.66	1.27	1.88	2.49	3.11	3.72
32	.21	.36	.36	.68	1.31	1.94	2.57	3.21	3.84
33	.21	.37	.37	.70	1.35	2.00	2.65	3.31	3.96
34	.22	.38	.38	.72	1.39	2.06	2.73	3.41	4.08
35	.22	.39	.39	.74	1.43	2.12	2.81	3.51	4.20
36	.23	.40	.40	.76	1.47	2.18	2.89	3.61	4.32
37	.23	.41	.41	.78	1.51	2.24	2.97	3.71	4.44
38	.24	.42	.42	.80	1.55	2.30	3.05	3.81	4.56
39	.24	.43	.43	.82	1.59	2.36	3.13	3.91	4.68
40	.25	.44	.44	.84	1.63	2.42	3.21	4.01	4.80
41	.25	.45	.45	.86	1.67	2.48	3.29	4.11	4.92
42	.26	.46	.46	.88	1.71	2.54	3.37	4.21	5.04
43	.26	.47	.47	.90	1.75	2.60	3.45	4.31	5.16
44	.27	.48	.48	.92	1.79	2.66	3.53	4.41	5.28
45	.27	.49	.49	.94	1.83	2.72	3.61	4.51	5.40
46	.28	.50	.50	.96	1.87	2.78	3.69	4.61	5.52
47	.28	.51	.51	.98	1.91	2.84	3.77	4.71	5.64
48	.29	.52	.52	1.00	1.95	2.90	3.85	4.81	5.76
49	.29	.53	.53	1.02	1.99	2.96	3.93	4.91	5.88
50	.30	.54	.54	1.04	2.03	3.02	4.01	5.01	6.00
51	.30	.55	.55	1.06					
52	.31	.56	.56	1.08					
53	.31	.57	.57	1.10					
54	.32	.58	.58	1.12					
55	.32	.59	.59	1.14					
56	.33	.60	.60	1.16					
57	.33	.61	.61	1.18					
58	.34	.62	.62	1.20					
59	.34	.63	.63	1.22					
60	.35	.64	.64	1.24					
61	.35	.65	.65	1.26					
62	.36	.66	.66	1.28					
63	.36	.67	.67	1.30					
64	.37	.68	.68	1.32					
65	.37	.69	.69	1.34					
66	.38	.70	.70	1.36					
67	.38	.71	.71	1.38					
68	.39	.72	.72	1.40					
69	.39	.73	.73	1.42					
70	.40	.74	.74	1.44					
..	...	...	...	....					

Parcels weighing 4 ounces or less, except books, seeds, plants, etc., 1 cent for each ounce or fraction thereof, any distance.

Parcels weighing 8 ounces or less, containing books, seeds, cuttings, bulbs, roots, scions and plants, 1 cent for each 2 ounces or fraction thereof, regardless of distance.

Parcels weighing more than 8 ounces, containing books, seeds, plants, etc., parcels of miscellaneous printed matter weighing more than 4 pounds and all other parcels of fourth-class matter weighing more than 4 ounces are chargeable, according to distance or zone, at the pound rates shown in the above table, a fraction of a pound being considered a full pound.

The Limit of Weight of fourth-class matter is 70 pounds for parcels mailed for delivery within the first, second and third zones, and 50 pounds for all other zones.

Limit of Size. Parcel post matter may not exceed 84 inches in length and girth combined. In measuring a parcel the greatest distance in a straight line between the ends (but not around the parcel) is taken as its length, while the distance around the parcel at its thickest part is taken as its girth. For example, a parcel 35 inches long, 10 inches wide and 5 inches high measures 65 inches in length and girth combined.

PARCEL POST INFORMATION

The act of Congress authorizing the establishment of a parcel post system provides that on and after January 1, 1913, fourth class mail matter shall embrace all other matter, including farm and factory products, not now embraced by law in either the first, second or third class, not exceeding 20 pounds in weight except when for the first or second zones, where the maximum weight mailable is increased to 50 pounds. Packages must not be in form nor kind likely to injure the person of any postal employe or damage the mail equipment or other mail matter, and not of a character perishable within a period reasonably required for transportation and delivery. Parcels must not exceed 72 inches in length and girth combined.

SPECIAL DELIVERY SERVICE

A mailable parcel will be accorded the usual special delivery service when a special delivery stamp or 10 cents in ordinary stamps are affixed thereto in addition to the postage. When ordinary stamps are used the words "special delivery" must be placed on the wrapper.

INSURANCE ON PARCELS

A mailable parcel on which the postage is fully prepaid may be insured (it cannot be registered) against loss in an amount equivalent to its actual value, but not to exceed 25.00, on payment of a fee of 5 cents in parcel post stamps and in an amount equivalent to its actual value in excess of 25.00, but not to exceed 50.00, on payment of a fee of 10 cents in stamps, such stamps to be affixed. The amount of the insurance fee shall be placed on the receipt given the sender and on the coupon retained at the mailing office.

C. O. D.

The sender of a mailable parcel on which the postage is fully prepaid may have the price of the article and the charges thereon collected from the addressee on payment of a fee of 10 cents in ordinary postage stamps affixed, provided the amount to be collected does not exceed 100.00. Such a parcel will be insured against loss, without additional charge, in an amount equivalent to its actual value, but not to exceed 50.00.

The sender of a collect on delivery (C. O. D.) parcel will be given a receipt showing the office and date of mailing, the number of the parcel, and the amount due him.

A C. O. D. parcel will be accepted for mailing only at a money order office and when addressed to a money order office. Money order offices are designated in the parcel post guide by an asterisk (*) or a dagger (†). The postmaster at the mailing office will be held responsible for the postage required for the return of a parcel addressed to a non-money order office.

TELEGRAPH CODE

QUOTATIONS, ORDERS AND SHIPMENTS—CONTINUED

FOR DEALERS

BEG.....We will ship immediately.
BEGGAR.....We will try to ship.
BEGRUDGE....We expect to ship.
BEHAVE.....We shipped your order.
BEHEAD.....We will trace.
BEHEST.....We have no order.
BEHOLD.....We have ready for shipment.
BELAY.....We are holding the order for ——, shall we ship balance without them?
BEMOAN.....We have suspended work on your order.
BENEFIT.....We have canceled your order.
BENGAL.....Order is being executed and cannot be cancelled.
BENUMB.....Your letter was not received in time.
BEQUEST.....Your telegram was not received in time.
BESET.....Your telegram was unintelligible. Please repeat.
BESOUGHT....We quote you.
BESTOW.....We will accept order.
BETIDE.....We can not accept order.
BETOKEN.....We will hold offer open.
BETRAY.....We can not hold offer open.
BETROTH.....We hereby withdraw all quotations.
BEWAIL.....The price of —— is to-day advanced to ——.
BEWITCH.....Please specify quantity wanted.
BIGNESS.....Please specify sizes and quantity wanted.
BIGOT.....Please send shipping instructions.
BILLIARDS....See our letter of ——.
BIPED.....See our telegram of ——.
BIRTH.....Telegraph to-morrow.
BISCUIT.....Please reply immediately by telegraph.
BISHOP.....Answer by wire at our expense.
BISMUTH.....Must have answer by ——.
BISON.....Will send particulars by mail.
BLAB.....Please answer our letter of the ——.
BLACKING....Please answer our telegram of the ——.

PHRASES

BLAME.....If ordered immediately.
BLAMELESS...If ordered immediately by wire.
BLANCH.....For immediate acceptance.
BLANKET.....For immediate acceptance and shipment.
BLARNEY.....For acceptance within ——.
BLAST.....Less freight allowance per 100 pounds of ——.
BLEED.....Referring to your letter of ——.
BLEMISH.....Referring to your telegram of ——.
BLENDING....In reply to your favor of the ——.
BLESS.....Your order of the ——.
BLESSING.....Our order of the ——.
BLIGHT.....Your order for ——.
BLISSFUL.....Our order for ——.
BLISTER.....In addition to previous order.
BLOAT.....In less than ——.
BLOODY.....Not less than ——.
BLOTCH.....No sooner than ——.
BLOUSE.....Not later than ——.
BLOW.....During this week.
BLUBBER.....Last of this week.
BLUFF.....During next week.
BLUNDER.....Early next week.
BLUNT.....About middle of next week.
BOARD.....Last of next week.
BOAST.....First week in ——.
BOAT.....Second week in ——.
BOBBIN.....Third week in ——.
BOLD.....Last week in ——.
BOLSTER.....Within the next ——.
BOMBARD.....Within a few days.
BOMBAST.....Within one week.
BOMBAY.....Within ten days.
BONDMAN.....Within two weeks.
BONNET.....Within three weeks.
BORROW.....Within four weeks.
BOSOM.....Within a reasonable time.
BOTANY.....Per foot net.
BOUNCE.....Per foot less ——.
BOUND.....Per 100 feet net.
BOUNTY.....Per 100 feet less ——.
BOWLDER.....Per pound net.
BOWLING.....Per pound less ——.
BRACKET.....Per 100 pounds net.
BRAG.....Per 100 pounds less ——.
BRAIN.....Per dozen net.
BRANCH.....Per dozen less ——.
BRAMBLE.....Per 100 net.
BRAVADO.....Per 100 less.

TELEGRAPH CODE

QUOTATIONS, ORDERS, AND SHIPMENTS

FOR BUYERS

Abaft.....Have you in stock, if not, how soon can you furnish?
Abduct.....Can you ship at once?
Abhor.....At what price and how soon can you furnish?
Abode.....Can you ship?
Abound....Have you shipped?
Abridge....If not, when will you ship?
Adam.....When will you ship balance of our order of ——?
Adder.....Quote us lowest price on ——.
Addling....Advise by wire how soon you can ship.
Adept.....We will accept offer.
Adjunct....Enter our order for ——.
Admire....Ship immediately.
Admix.....Ship as soon as possible.
Affect.....Ship by express.
Affright....If you cannot ship in time named, advise us by telegraph.
Affront.....If you can not ship at once, cancel.
Afresh.....If not already shipped, cancel.
Agate.....Ship with sight draft attached to bill of lading.
Babble.....Get ready and hold for shipping directions.
Baboon....Ship what you have in stock and let balance follow.
Baby.....Ship what you have in stock and hold balance for further instructions.
Back.....Hold for further instructions our order of ——.
Backing....Cancel our order of ——.
Badger.....Ship goods ordered at once.
Badness....Hasten shipment of.
Baffling....Send tracer for shipment.
Bag.....Get through rate of freight.
Bailiff.....Prepay freight.

WROUGHT PIPE

Extra Strong.....**Schley**
Double Extra Strong.....**Dewey**

NUMBER OF FEET

25 feet.....**Africa**
50 " .....**Alabama**
75 " .....**Arizona**
100 " .....**Asia**
200 " .....**Belgium**
300 " .....**Chili**
400 " .....**Denmark**
500 " .....**Egypt**
600 " .....**France**
700 " .....**Germany**
800 feet.....**Holland**
900 " .....**Ireland**
1000 " .....**Japan**
2000 " .....**Kentucky**
3000 " .....**Liberia**
4000 " .....**Maine**
5000 " .....**Nevada**
6000 " .....**Ohio**
7000 " .....**Peru**
8000 feet.....**Russia**
9000 " .....**Spain**
10000 " .....**Texas**
15000 " .....**Uruguay**
20000 " .....**Valparaiso**
25000 " .....**Washington**
30000 " .....**Xenia**
40000 " .....**Yorkville**
50000 " .....**Zanesville**

BLACK PIPE

⅛ inch.....**Allegheny**
¼ " .....**Baltimore**
⅜ " .....**Camden**
½ " .....**Detroit**
¾ " .....**Erie**
1 " .....**Fairmont**
1¼ " .....**Galena**
1½ inch.....**Harrisburg**
2 " .....**Ithaca**
2½ " .....**Jamestown**
3 " .....**Kensington**
3½ " .....**Lancaster**
4 " .....**Macon**
4½ " .....**Quincy**
5 inch.....**Newark**
6 " .....**Oneida**
7 " .....**Paris**
8 " .....**Reading**
9 " .....**Salem**
10 " .....**Troy**
12 " .....**Utica**

GALVANIZED PIPE

¼ inch.....**Amazon**
⅜ " .....**Bay**
½ " .....**Colorado**
¾ " .....**Danube**
1 " .....**Elbe**
1¼ " .....**Firth**
1½ " .....**Ganges**
2 inch.....**Hudson**
2½ " .....**Indus**
3 " .....**Juniata**
3½ " .....**Kanawha**
4 " .....**Lake**
4½ " .....**Miami**
5 " .....**Nile**
6 inch.....**Osage**
7 " .....**Po**
8 " .....**Rhine**
9 " .....**Seine**
10 " .....**Tweed**
12 " .....**Ural**

TELEGRAPH CODE

ORDERS, FREIGHT AND ROUTING

Haba ..... Are you making any shipments for us?
Habe ..... Are you making the following shipments.....?
Habo ..... By what route did you ship?
Habs ..... Shipment made by.....
Habt ..... Can arrange for immediate shipment.
Habu ..... Can make no shipments until.....
Haca ..... Can you arrange for immediate shipment?
Hack ..... Have on hand for immediate shipment.
Haco ..... Have you on hand for immediate shipment?
Hact ..... Can we substitute.....in place of your order for..... as we are entirely out of what you ordered?
Hacu ..... Substitute.....in place of.....
Hada ..... Car number.
Hade ..... Carload lots.
Hado ..... Consigned.....care of.....
Hads ..... Freight allowance of.....
Haeb ..... Freight allowance not to exceed.....
Haek ..... Approximate freight rate is.....
Haet ..... Freight rates are advancing.
Haeu ..... Hold for future instructions.
Haev ..... In same car.
Hafe ..... In less than carload lots.
Hafi ..... Must be shipped.
Hafo ..... Route goods on order.....by way of.....
Hafs ..... Send tracer for shipment (s).
Haft ..... Shall we ship.....?
Hafu ..... Ship by express.
Haga ..... Ship by express charges collect.
Hage ..... Ship by express C. O. D.
Hagm..... Ship by fast freight.
Hago ..... Ship by fast freight to.....
Hags ..... Too late to stop shipment, which has been (was) made.
Hahm ..... Trace by wire, shipments.....
Hahn..... Unload cars at our expense.
Haht ..... Wire initials and car number.
Hahu..... Wire initials and number of cars, route and date of shipment.
Haif ..... Add to order.
Haik ..... Add to order of this date.....
Hain ..... All orders for.....have been filled.....
Haix ..... Can you duplicate.....order (s).....
Haja ..... Correct order (s) to read.....
Haje ..... Duplicate.....and order (s).....
Haka..... See your order (s).....and wire us whether item is correctly specified.
Hako..... See your order (s).....we are holding for instructions.
Hakt ..... Shall we cancel order?
Hala ..... Shall we ship what we have already, and let balance follow?
Halb ..... Ship all you can.
Hald ..... Ship as soon as possible.
Hale ..... Ship to-day surely.
Haln ..... Ship what you can and let balance follow.
Hals ..... Ship with our order of.....
Hamb ..... Too late to cancel order (s).
Hame..... We are unable to ship.....on account of.....
Hamp ..... Will ship balance due on order (s).....and complete.
Hamu ..... Will ship from stock.
Hani ..... Will ship within or by.....
Hanp..... Why do you not ship our order?

FREIGHT CLAIMS

All goods are packed by skilled men. If an article is broken in transit, the condition of the package at its destination is no evidence of its original condition. We cannot be responsible for loss or damage after we take the transportation company's receipt. If goods arrive at destination damaged or in bad order, consignee should see that receipt is given accordingly, so that recourse may be had on the transportation company. We will however assist our customers in collecting claims wherever possible.

HOW TO MAKE FREIGHT CLAIMS

The following valuable information, compiled by a competent railroad authority will be of assistance in filing claims:

The policy of all railroad companies is to establish the validity of every claim filed and not to avoid liability, and the honest, frank and hearty co-operation on the part of all concerned in presenting claims with the evidence desired does much to expedite settlement.

Some suggestions are offered relative to the preparation of claims, which dealers will do well to observe. If the claim is for loss or damage the following documents should be submitted in support of the claim:

Original bill of lading.
Original paid freight bill.
Original invoice or attest copy.

Statement of claimant showing how the amount of loss or damage has been determined, with all the evidence he can possibly secure or that may be necessary to substantiate same.

Bill for cost of repairs, account sales, or such other document as will verify amount claimed.

When the claim is for overcharge the bill of lading, freight bill and evidence of the weight of the shipment should be submitted; also a statement showing how the claimant has determined the amount of the overcharge with definite authority for the rate claimed.

If any of the documents are missing their absence should be explained and if it is impossible to supply the original bill of lading or freight bill, claimant should indemnify the carrier against loss in the payment of duplicate claims supported by the original documents.

Any loss or damage should be reported to the agent of the delivering line immediately on discovery and every opportunity should be afforded him to inspect and verify same and in no case should report of this loss or damage be delayed beyond twenty-four hours after receipt.

Delays in completing investigation are sometimes unavoidable on account of the numerous agencies involved. It must be borne in mind that every claim must undergo some investigation, since reports of loss or damage are not always at the finger tips of the claim department.

Delays in adjusting claims for damages often come about through the refusal of the consignee to accept property which has been delayed or damaged in transit. It should be understood that the acceptance of such delayed or damaged property does not in any way jeopardize any proper claim which the owner may have against the carrier. In fact, the law expressly provides that consignee must accept his own property and use all diligence in disposing of it with a view of minimizing the loss.

The "acknowledgment receipt" of a claim is through the medium of a postal card bearing claim number under which all correspondence pertaining to that claim is handled, and it would expedite the work to no little extent if reference is made to the claim number in any correspondence from the claimants or on statements of accounts subsequently referred.

INDEX

A

Page

Abrasite Cloth 491
Acetylene Hose 724
Regulators, Imperial 719
Adze Handles 539–541
Adzes, Railroad 517
Air Brake Hose 205
Cocks 174, 175
Compressor Information....778-782
Drill Hose 205, 210, 213
Hose 214
Pump Unions 33
Valves, Radiator 161, 162
Alcohol Torches 273
Alphabets, Steel 617
Altitude Gauges 171
Aluminum 270
Alundum Grain 267
Ambulances, Auto 699
Ammonia Gauges 172
Anchoring Systems, Cinch..... 597
Angle Check Valves, Brass, Jenkins 80
Check Valves, Brass, Standard 77, 78
Check Valves, Brass, Williams. 87
Check Valves, Bronze, Lunkenheimer 83, 84
Check Valves, Iron Body, Jenkins 98
Check Valves, Iron Body, Lunkenheimer 102
Check Valves, Iron Body, Williams 109
Valves, Brass, Jenkins 79
Valves, Brass, Standard 76, 78
Valves, Brass, Williams.85, 86, 107
Valves, Bronze, Lunkenheimer 81, 82
Valves, Iron Body, Extra Heavy 108
Valves, Iron Body, Jenkins..... 97
Valves, Iron Body, Jenkins Disc 95
Valves, Iron Body, Lunkenheimer 99–101
Valves, Iron Body, Medium.... 108
Valves, Iron Body, Standard ... 94
Antimony 270
Anvils, National Vulcan 542
Aprons, Blacksmiths' 545
Horseshoers' 545
Arbors, Drill Chuck, Standard..... 404
Screw Slotting, Cutter 381
Shell Drill, Cleveland 368

Page

Arbors, Shell Reamer, Cleveland... 368
Areas of Circles, Table of..... 765
Asbestos Cement 237
Corrugated Fireproof Paper.... 237
Felt and Roll Board, Non-Burn. 237
Gaskets 235
Rope Packing 232
Sheet Millboard 237
Wick Packing 232
Asphalt Mattocks 516
Assortments, Crayon 616
Attachment Plugs 733
Auger Bits 438, 439
Augers, Boring Machine 441
Breast, Hardsocg 640
Ship 438, 440
Auto Ambulances 699
Hoists, Weaver 702
Jacks, Barrett 512
Awls, Belt 204
Axe Handles 539–541
Axes, Dolble-Bit 537
Handled, Double-Bit 537
Handled, Single-Bit 537
Single-Bit 537
Stone 535
Axle Grease 256

B

Babbitt Metal 268, 269
Back Flaps 613
Saws 621
Bag Trucks 692
Ball Check Valves, Brass, Standard 77
Check Valves, Brass, Williams. 87
Check Valves, Bronze, Lunkenheimer 83
Lamp Wick 717
Points, Starrett 477
Ball and Socket Hangers, Dodge.295–301
Ballast per Mile, Cubic Yards..... 523
Balls, Steel, Hoover 564
Band Saws 624
Bar Clamps, Measuring 479
Tin 270
Barbed Nails 612
Barrel Nails 612
Trucks 692
Barrows, Wheel 688, 689
Bars, Claw 519
Cord, Metal, Magnolia 268

Page

Bars, Crow 519
Extension 60
Grate 642
Lining 519
Slice 643
Steel, Weights of 602, 603
Tamping 519, 641
Tee 643
Bases, Switch 742
Valve Box 651
Batteries, Dry, Columbia 739
Battery Switches 742
Beam Clamps 60
Hooks 61
Bearing Scrapers 321
Bearings, Hanger, Dodge..... 305
Journal, Dodge 306
Rigid, Dodge 305
Bell Hangers' Gimlets 441
Bellows, Molders' 545
Bells and Flanges, Pipe, Cast Iron.. 15
Belt Awls 204
Cement 194
Cement, Leather 193
Clamps 204
Couplings 195
Dressing 193, 194
Fasteners 200, 201
Hooks 196
Lacing, Metallic 195
Lacing, Steel 196–199
Punches 203
Reamers 204
Tighteners, Dodge 309
Beltine 193
Belting, Canvas, Stitched 192
Leather 186, 187
Link, Detachable 310, 313
Rubber 188–191
Belting Information 755, 764, 769
Belts, Round, Leather 187
Bench Drill Presses 448
Oilers 251
Shears 634
Benders, Rail 522
Bends, Pipe, Cast Iron 14
Pipe, Welded, Lap..... 17
Return, Brass, Finished 70
Return, Cast Iron, Standard.... 43
Return, Malleable Iron..... 27
Y, Brass, Finished 70
Y, Cast Iron, Standard 39
Bevel Protractors, Starrett..... 465
Protractors and Squares, Combination 465
Bevels 435
Combination, Starrett 466
Improved, Starrett 466
Universal, Starrett 466
Bibb Washers 74
Bibbs, Compression 74
Ground Key 73, 74
Hose, Ground Key.....73, 74

Page

Bismuth 270
Bit Brace Taps 391
Braces 443
Holders, Extension 443
Stock Reamers, Cleveland 373
Stock Twist Drills, Cleveland.. 364
Stocks, Angular 443
Bits, Auger 438, 439
Car 440
Chisel, Circular Saw 627
Cutter, Lathe Tool 410
Expansive 441
Gimlet 441
Lathe Tool 411
Machine 438, 440
Blacksmiths' Calipers, Starrett 477
Hammers 534
Sledges 536
Twist Drills, Cleveland 365
Blades, Saw, Hack 425, 428
Blast Gates, Western Chief 549
Blasting Cap Crimpers 637
Caps 636, 637
Fuses 637
Machines 637
Paper, Waterproof 641
Supplies, Atlas 637
Block Sheaves, Snatch..... 669
Sheaves, Tackle 669
Blocks, Cable Hoisting, Yale..... 686
Chain Hoisting, Yale 678–685
Gin, Wire Rope 675
Gin, Wrought Iron 675
Hoisting, Metal 672
Hoisting, Steel 674, 671, 674
Hoisting, Wood 668, 670
Hoisting, Wrought Iron 673
Pillow, Dodge 306–308
Snatch, Steel 670
Snatch, Tarbox 670, 673
Snatch, Wire Rope 673
Snatch, Wood 670
Swage 542
Tackle, Metal, Tarbox..... 672
Tackle, Safety, Star 676
Tackle, Steel 671
Tackle, Wire Rope 674
Tackle, Wood 668
Blow Torches 273
Blowers, Hand, Forge 554
Pressure 557, 558
Volume 557
Blow-off Valves, Bronze, Lunkenheimer 113
Valves, Iron Body, Lunkenheimer 113
Valves, Lunkenheimer 113
Board, Friction 259
Mill, Sheet, Asbestos 237
Boat Nails 612
Spikes 524
Bobs, Plumb, Starrett 482
Body Extensions, Auto 699

Page

Boiler Bolts, Steel 595
Compound 265
Graphite, Mexican 262
Information 774, 775
Neverleak 142
Patch Bolts 595
Picks 514
Rivets 569
Taps 392
Tube Cleaners..... 278
Tube Expanders 279
Tube Ferrules, Copper 6
Tubes 5
Boilermakers' Jacks 508
Boilers, Heating, Capitol...129–134, 139
Heating, Capitol-Winchester 135–139
Sectional, Capitol 129–134, 139
Round, Capitol-Winchester.... 135,
..... 137–139
Bolt Clippers 546, 547
Ends 588
Taps, Stove 389
Washers 588
Bolts, Boiler, Steel..... 595
Bucket, Elevator 593
Carriage, Common 592
Cultivator 589
Machine 590, 591
Patch, Boiler 595
Pipe, Spiral 12
Planer Head 588
Plow 589
Stove 593
Stud 594
Track 525
Borax-ette 275
Boring Machines, Angular..... 441
Tools, Armstrong 414, 415
Tools, O. K. 412, 413
Box Covers, Valve..... 651
Nails 612
Trucks 693
Boxes, Match, Waterproof..... 711
Shafting, Dodge 306
Valve 651
Braces, Bit 443
Drill 443
Ratchet 442
Bracket Hangers, Wall, Pioneer.... 304
Brackets, Tank, Expansion, Ideal.. 156
Brads 612
Bragdon Sockets 735
Brake Hose, Air..... 205
Branch Tees 35
Branches, Y, Cast Iron, Extra Heavy 45
Y, Cast Iron, Standard.....41, 53
Y, Malleable Iron..... 26
Y, Pipe, Cast Iron..... 15
Brass Angle Valves, Jenkins..... 79
Angle Valves, Standard.....76, 78
Angle Valves, Williams 85, 86, 107
Butterfly Valves 90
Check Valves, Angle, Jenkins.. 80

Page

Brass Check Valves, Angle, Standard 77
Check Valves, Angle, Williams. 87
Check Valves, Ball, Standard.. 77
Check Valves, Ball, Williams.. 87
Check Valves, Horizontal, Jenkins 80
Check Valves, Horizontal, Standard 77
Check Valves, Horizontal, Williams 87
Check Valves, Swing, Jenkins. 80
Check Valves, Swing, Standard 77
Check Valves, Swing, Williams. 87
Check Valves, Vertical, Standard 77
Check Valves, Vertical, Williams 87
Cross Valves, Jenkins..... 79
Cross Valves, Standard.....76, 78
Cross Valves, William..85, 86, 107
Cylinder Relief Valves..... 115
Fittings, Finished 70
Foot Valves 110
Gas Service Cocks 75
Gate Valves, Jenkins..... 92
Gate Valves, Quick-Opening .. 91
Gate Valves, Standard..... 91
Gate Valves, Williams..... 88
Globe Valves, Jenkins..... 79
Globe Valves, Standard.....76, 78
Globe Valves, Williams..85, 86, 107
Hose Valves 86
Pop Safety Valves..... 114
Railing Fittings 69
Throttle Valves 90
Valves, Extra Heavy, Williams 87, 107
Valves, Jenkins 79, 80
Valves, Regrinding, Williams.. 107
Valves, Standard 76–78, 89, 90
Valves, Williams 85–87, 107
Water Relief Valves..... 115
Brazing Plates, Laffitte..... 276
Powder, Laffitte 276
Breast Augers, Hardsocg..... 640
Drills 446, 447
Brewers' Hose 205
Bricklayers' Hammers 533
Scutches 533
Bridge Reamers, Taper, Cleveland.. 372
Broad Hatchets 538
Bronze 270
Bronze Angle Valves, Lunkenheimer 81, 82
Blow-off Valves, Lunkenheimer 113
Check Valves, Angle, Lunkenheimer 84
Check Valves, Ball, Lunkenheimer 83
Check Valves, Horizontal, Lunkenheimer 83, 84
Check Valves, Vertical, Lunkenheimer 83

Page

Bronze Cross Valves, Lunkenheimer 81
Gate Valves, Chapman..... 92
Gate Valves, Handy..... 90
Gate Valves, Lunkenheimer... 93
Globe Valves, Lunkenheimer 81, 82
Hose 214
Valves, Extra Heavy, Lunkenheimer 81
Valves, Lunkenheimer 81–84
Valves, Regrinding, Lunkenheimer 83, 113
Valves, Renewo, Lunkenheimer 82
Brooms, Pilley's 633
Wire 633
Brushes, Casting 633
Flue 277
Flue, Spiral 277
Foundry 633
Scratch 633
Tube, Wire, Expansion..... 277
Wire, Pilley's 633
Brushes and Scrapers, Coil, Combined 277
and Scrapers, Flue, Combination 277
Bucket Bolts, Elevator..... 593
Pumps, Valveless 701
Buckets, Elevator, Malleable Iron 317, 318
Elevator, Steel 319
Builders' Jacks 508
Bulbs, Mazda 749–751
Bulldog Vises 348, 349
Burring Outfits, Lead, Imperial..... 723
Reamers 393
Burrs, Copper 204
Bush Hammers 535
Mattocks 516
Bushing Bars, Metal..... 268
Bushings, Brass, Finished..... 70
Cast Iron, Standard.....39, 42, 44
Cock, Asbestos Packed..... 112
Hose 217
Malleable Iron 28
Malleable Iron, Standard..... 39
Pulley, Wood Split, Dodge..... 286
Butterfly Valves, Brass..... 90
Valves, Iron Body..... 90
Button Gauges, Starrett..... 467
Butts, Back Flap, Steel..... 613
Steel 613

C

C Clamps 409
Cabinet Chisels, Socket..... 436
Cabinetmakers' Screwdrivers 432
Cable, Rubber Covered.....727, 728
Cable Grease, Graphite, Mexican... 263
Tape 738
Caliper Gauges, Starrett..... 467
Rules, Starrett 461
Squares, Starrett 467

Page

Caliper Stands, Micrometer, Starrett 472
Calipers, Blacksmiths', Starrett.... 477
Boxwood 457
Fay Patent, Starrett..... 475
Firm-joint, Starrett 473
Hermaphrodite, Starrett 476
Inside, Starrett 473–475
Lock-joint, Starrett 473
Micrometer, Starrett ..468–470, 472
Outside, Starrett 473–475
Slide, Pocket, Starrett..... 467
Thread, Starrett 474
Toolmakers', Starrett 475
Transfer, Starrett 473
Yankee, Starrett 474
Calking Cement, Smooth-On..... 266
Camping Mattocks 516
Candle Wick Packing..... 232
Candles, Miners'..... 709
Mining, Granite 709
Candlesticks, Miners' 709
Cant Hooks 615
Canvas Belting, Stitched..... 192
Cap Screw Wrenches..... 577
Screws 573–577
Caps, Blasting 636, 637
Brass, Finished 70
Cast Iron, Standard.....39, 42
Detonating 636
Malleable Iron 28
Miners' 711, 716
Pipe, Cast Iron..... 14
Car Bits 440
Heating Hose 205
Jacks 509
Movers, Samson 518
Nails 612
Replacers 522
Wrenches 325
Carbide, Union 717
Carbide Containers, Miners' Lamp. 711
Flasks, Miners' Lamp..... 711
Carbon Scrapers 321
Cards, File 424
Carpenter Handles, House..... 540
Carpenters' Chalk 616
Jacks 508
Squares, Starrett 462, 463
Carriage Bolts, Common..... 592
Clamps 408
Carriers, Timber 615
Carts, Concrete 689
Cases, Emergency, Johnson's..... 718
Casing, Lap Welded..... 8
Casing Nails 612
Cast Iron Companion Flanges..... 59
Fittings, Extra Heavy.....45, 59
Fittings, Flanged, Extra Heavy 59
Fittings, Flanged, Standard 49–54, 57
Fittings, Long Turn..... 46
Fittings, Screwed 37
Fittings, Screwed, Extra Heavy 45
Fittings, Screwed, Long Turn 46, 47

Page

Cast Iron Fittings, Screwed, Standard 35, 38–44, 48
Fittings, Standard .....35–44, ...48–55, 57, 58, 61
Flange Unions 34
Long Turn Fittings..... 47
Pipe, Specials for.....13–15
Radiators 143–151
Casting Brushes 633
Castings, Cement, Smooth-On..... 266
Cells, Dry, Columbia..... 739
Cement, Asbestos 237
Belt 194
Belt, Leather 193
Calking, Smooth-On 266
Castings, Smooth-On 266
Elastic, Smooth-On 266
Iron, Smooth-On 266
Magnesia 237
Pipe, Graphite 261
Rivet, Smooth-On 266
Center Drills, Cleveland..... 366
Gauges, Starrett 486
Reamers, Cleveland 366
Testers, Starrett 489
Chain, Coil 677
Link, Detachable 310–313
Chain Drills 448
Hoists, Yale 678–685
Hooks, Vulcan 666
Pipe Tongs, Vulcan..... 330
Pipe Vises 353
Pipe Wrenches, Champion..... 331
Pipe and Fittings Tongs, Agrippa 330
Chalk, Carpenters' 616
Chandelier Hooks, Malleable Iron.. 28
Changers, Tire, Weaver..... 704
Chasers, Screw 392
Check Valves, Angle, Brass, Jenkins 80
Valves, Angle, Brass, Standard. 78
Valves, Brass, Angle, Standard. 77
Valves, Brass, Angle, Williams. 87
Valves, Brass, Ball, Standard.. 77
Valves, Brass, Ball, Williams.. 87
Valves, Brass, Horizontal, Jenkins 80
Valves, Brass, Horizontal, Standard 77, 78
Valves, Brass, Horizontal, Williams 87
Valves, Brass, Swing, Jenkins. 80
Valves, Brass, Swing, Standard. 77
Valves, Brass, Swing, Williams. 87
Valves, Brass, Vertical, Standard 77
Valves, Brass, Vertical, Williams 87
Valves Bronze, Angle, Lunkenheimer 83, 84
Valves, Bronze, Ball, Lunkenheimer 83

Page

Check Valves, Bronze Horizontal, Lunkenheimer 83, 84
Valves, Bronze, Vertical, Lunkenheimer 83
Valves, Hydraulic Gauge..... 173
Valves, Iron Body, Angle, Jenkins 98
Valves, Iron Body, Angle, Lunkenheimer 102
Valves, Iron Body, Angle, Williams 109
Valves, Iron Body, Horizontal, Jenkins 98
Valves, Iron Body, Horizontal, Lunkenheimer 102
Valves, Iron Body, Horizontal, Standard 96
Valves, Iron Body, Horizontal, Williams 109
Valves, Iron Body, Swing, Jenkins 98
Valves, Iron Body, Swing, Standard 96
Valves, Iron Body, Swing, Williams 109
Valves, Iron Body, Vertical, Standard 96
Valves, Swing, Regrinding, Lunkenheimer 84
Checks, Miners' 717
Chime Whistles, Steam..... 177
Chimneys, Area Of..... 775
Chipping Hammers 533
Vises 346
Chisel Bits, Circular Saw..... 627
Sets 437
Chisels, Cabinet, Socket..... 436
Cape 437
Cold 437, 543
Diamond Point 437
Engineers' 320
Firmer, Socket 436
Framing, Socket 436
Hot 543
Key-seating 437
Oil Groove 437
Round Nose 437
Track 520
Chucking Reamers, Fluted, Cleveland 371
Reamers, Rose, Cleveland..... 371
Chucks, Drill, Jacobs..... 403
Drill, Skinner 402
Drill, Standard 404
Drill, Star 401
Lathe, Cushman 405, 406
Planer, Skinner 352
Tap 394
Circular Flanges, Cast Iron, Standard 48
Saw Chisel Bits..... 627
Saw Shanks 627

Page
Circular Saws 626, 628
Circumference Gauges, Starrett.... 467
Clamps, Bar, Measuring..... 479
Beam 60
Belt 204
C 409
Carriage 408
Hose 216
Joint, Pipe, Skinner..... 63
Key-seat, Starrett 486
Machinists' 408, 409
Pipe, Emergency 63
Puller, Weaver 703
Rule, Starrett 486
Splicing 431
Toolmakers', Starrett 480
Wire Rope 665
Clamps and Drill Blocks, Starrett.. 480
Classification, Malleable Iron Fittings 22, 23
Steel, Standard 599, 600
Steel, Tool 604
Claw Bars 519
Hatchets 538
Hooks 643
Cleaners, Tube, Boiler..... 278
Tube, Steam 277
Cleat Receptacles, Porcelain..... 737
Cleats, Porcelain 733
Clinch Nails 612
Clip Gate Valves, Iron Body, Lunkenheimer 104
Clippers, Bolt 546, 547
Clips, Crosby 665
Clock Attachments, Heat Regulator, Minneapolis 152
Clocks, Watchmen's Portable..... 185
Cloth, Abrasite 491
Crocus 491
Emery 491
Wire, Mining 607, 608
Cloth Inserted Gaskets..... 235
Coach Screws 580
Coal Drilling Machines, Hardsocg.. 639
Mauls 535
Miners' Riddles 635
Mining Machine Shovels..... 529
Pick Eyes 516
Picks 515
Screens 635
Shovels 528
Sledges 535
Cocks, Air 174, 175
Cylinder 175
Gauge, Steam 167
Plug, Asbestos Packed..... 112
Service, Gas, Brass 62, 75
Siphon 173
Steam, Brass 62, 75
Steam, Iron 111
Stop, Ground Key.....71, 72
Stop and Waste, Ground Key.71, 72

Page
Coil Brushes and Scrapers, Combined 277
Chain 677
Coke Shovels 528
Collars, Safety, Dodge..... 291
Shafting, Hallowell 292
Colored Crayons 616
Columns, Gauge, Water..... 163
Water, Reliance 164
Combination Torches, Imperial.... 719
Common Flanges, Cast Iron, Standard 48
Nails 612
Companion Flanges, Cast Iron..... 59
Flanges, Standard 57, 58
Compass Saws 621
Composition Sockets 735
Compound, Boiler 265
Grinding, Alundum 267
Grinding, Crystolon 267
Lubricating, Albany 265
Smooth-On 266
Splicing 738
Welding, Borax-ette 275
Welding, Cherry Heat..... 275
Welding, Climax 275
Welding, E-Z 275
Compressed Air Information....778–782
Compression Bibbs 74
Couplings, Dodge 293
Couplings, Shaw 294
Compressor Oil 257
Concave Cutters, Brown & Sharpe. 382
Concrete Carts 689
Picks 515
Conductors, Circular Loom..... 731
Steel, Armored 731
Conduit, Iron, Rigid..... 731
Connections, Hose, Siamese..... 217
Construction Wrenches 325
Containers, Carbide, Miners' Lamp. 711
Contractors' Picks 514
Convex Cutters, Brown & Sharpe... 382
Coopers' Froes 516
Copper Gaskets 236
Ingots 270
Coppers, Soldering 634
Cord, Flexible, Steel Armored..... 731
Lamp, Flexible 730
Sash 657
Cored Bars, Metal, Magnolia..... 268
Corks, Oil Cup..... 244
Corrugated Fireproof Paper, Asbestocel 237
Roofing 696–698
Siding 696, 697
Cotter Pins 566
Cotters, Spring 566
Cotton Waste, Colored..... 259
Waste, White 259
Countershafts, Grinder 506
Countersinks, Machine, Cleveland.. 366

Page

Countersinks and Drills, Combined, Cleveland 366
Couplings, Belt 195
Brass, Finished 70
Compression, Dodge 293
Compression, Shaw 294
Flanged, Dodge 293
High Pressure, Mulconroy..... 215
Hose 214, 216, 218
Malleable Iron 28
Reducing, Cast Iron, Standard. 44
Swivel 64
Tubing 18
Wrought Iron 18
Covering, Pipe 238, 239
Covers, Box, Valve..... 651
Cranes and Hoists, Floor, Portable. 653
Crayons, Colored 616
Lumber 616
Marking 616
Mill, Empire 616
Crimped Roofing 698
Crimpers, Blasting Cap..... 637
Crocus Cloth 491
Cross Pein Sledges..... 536
Ties per Mile of Single Track.. 523
Valves, Brass, Jenkins..... 79
Valves, Brass, Standard.....76, 78
Valves, Brass, Williams..85, 86, 107
Valves, Bronze, Lunkenheimer. 81
Valves, Iron Body, Extra Heavy 108
Valves, Iron Body, Jenkins.... 97
Valves, Iron Body, Lunkenheimer 99–101
Valves, Iron Body, Medium.... 108
Valves, Iron Body, Standard... 94
Crosscut Saws 623
Crosses, Brass, Finished..... 70
Cast Iron, Extra Heavy.....44, 45
Cast Iron, Long Turn.....46, 47
Cast Iron, Standard..38, 41, 44, 52
Hydraulic, Extra Heavy..... 29
Malleable Iron 26
Malleable Iron, Extra Heavy... 29
Pipe, Cast Iron..... 14
Railing, Brass 69
Railing, Malleable Iron.....68, 69
Crossovers, Malleable Iron..... 26
Cross-test Levels, Starrett..... 482
Crow Bars 519
Crushers, Portable, Telsmith..... 691
Crystolon Grain 267
Cultivator Bolts 589
Cup Grease 265
Grease, Graphite, Mexican..... 263
Grease, Polarine 257, 258
Cups, Grease, Brass.....240–243
Grease, Steel 240, 242
Oil, Glass 244, 245
Oil, Locomotive 244
U, Leather 226
Cut Lacing 195

Page

Cut-outs, Plug 734
Cutter Bits, Lathe Tool..... 410
Wheel Pins, Nye 333
Wheels, Nye 333
Cutters, Concave, Brown & Sharpe. 382
Convex, Brown & Sharpe..... 382
Expansive Bit 441
Gasket 202
Gasket and Washer, Century... 202
Gear, Brown & Sharpe..... 379
Glass, Gauge 168
Gummer, Saw 631
Lace 195
Lathe Tool 411
Milling, Brown & Sharpe...375–378
Pipe, Barnes 332
Pipe, Nye 333
Pipe, Saunders 332
Pipe, Trimo 332
Planer 410
Reamer Fluting, Brown & Sharpe 380
Reamer Grooving, Brown & Sharpe 380
Shaper 410
Slotting, Screw, Brown & Sharpe 385
Stocking, Brown & Sharpe..... 381
Tap Grooving, Brown & Sharpe. 380
Tool Holder, Armstrong 417
Washer 202
Whitney 565
Wire 429
Cutting Attachments, Imperial..... 719
Machines, Pipe, Forbes..... 344
Outfits, Imperial 719, 721, 722
Pipe 16
Tools, O. K. 413
Torches, Imperial 719
Cutting-off Tools, Armstrong..... 416
Cylinder Cocks 175
Leathers 226
Oil 256, 265
Relief Valves, Brass 115

D

D Handle Heads 530
Dado Heads, Huther..... 625
Damper Regulators, Clark 155
Regulators, Low Pressure..... 155
Data, Useful 752–783
Davy Board 259
Daylos, Eveready 748
Decarbonizing Outfits, Imperial....719, ... 721, 722
Deck Hose 205
Depth Gauges, Starrett 485
Detonating Caps 636
Diagonal Packing 233
Diaphragms, Pump 227
Pump Suction 227

Page

Diaphragms, Regulator, Pressure.. 227
Diemakers' Squares, Starrett 463
Dies, Solid, Hexagon, G. T. D. 400
Solid, Square, G. T. D..... 400
Dies and Stocks, Pipe, Armstrong.. 338, ... 339
Pipe, Hart's 342, 343
Pipe, Malleable 334
Pipe, Oster 340, 341
Pipe, Toledo 335–337
Dimensions, Wire Gauge 752
Discs, Valve, Jenkins 79
Ditching Shovels 527
Dividers, Extension, Starrett..... 477
Fay Patent, Starrett 475
Spring, Starrett 474
Toolmakers', Starrett 475
Universal, Starrett 476
Dogs, Lathe 407–409
Dollies 693
Double End Scrapers 641
Squares Starrett..... 462
Dowel Pins 612
Draft Gauges, Ellison 176
Drag Scrapers 690
Dressers, Grinding Wheel 505
Dressing, Belt 193, 194
Drifting Pick Eyes 516
Picks 514
Drill Blocks and Clamps, Starrett .. 480
Braces 443
Chucks, Jacobs 403
Chucks, Skinner 402
Chucks, Standard 404
Chucks, Star 401
Gauges, Starrett 487
Heads, Extension 596
Hose, Air 205, 210, 213
List 357
Press Vises 352
Presses, Bench 448
Ratchets, Keystone 449–451
Ratchets, Monarch 450
Sockets, Perfect Double Tang.. 355
Sockets, Taper Shank, Cleveland 355, 356
Sockets, Use-Em-Up 354
Steels, Crescent 605
Drilling Flanged Valves and Fittings, Prices for 56
Flanged Valves and Fittings, Templates for 55
Hammers 536
Machines, Hardsocg 639
Posts 451
Drills, Breast 446, 447
Center, Cleveland 366
Chain 448
Four Point 596
Hand 444–446
Post, Buffalo 559–561
Post, Hardsocg 638

Page

Drills, Post, Western Chief....562, 563
Single Bit 641
Track 522
Twist, Bit Shock, Cleveland.... 364
Twist, Blacksmiths', Cleveland 364
Twist, Blacksmiths', Cleveland. 365
Twist, Cleveland 358–366
Twist, Ratchet, Cleveland 364
Twist, Straight Shank, Cleveland 360–363
Twist, Taper Shank, Cleveland 358, 359
Twist, Wire Gauge, Cleveland.. 363
Yankee 446
Drills and Countersinks, Combined, Cleveland 366
and Pipe Taps, Combined 390
Drive Pipe 3
Drivers, Screw, Hurwood 432
Screw, Stanley 432
Screw, Yankee 433
Drivers' Lamps 715
Drop Hangers, Dodge 295–299
Dry Batteries, Columbia 739
Dynamite, Du Pont..... 636

E

Edges, Metal, Adustable, Starrett.. 460
Straight, Starrett 460
Ejector Stainers 184
Ejectors, Penberthy 183
Elastic Cement, Smooth-On 266
Elbows, Brass, Finished 70
Cast Iron, Extra Heavy 45
Cast Iron, Long Turn 46, 47
Cast Iron, Standard ..36, 40, 49, 50
Hydraulic, Extra Heavy 29
Malleable Iron 24
Malleable Iron, Extra Heavy ... 29
Railing, Brass 69
Railing, Malleable Iron 68, 69
Union 33, 160
Union, Malleable Iron,..... 30
Electric Hoists, Yale 686
Electrical Fuses 641
Units 772
Electricians' Gimlets 441
Levels, Starrett 481
Elevator Bucket Bolts 593
Buckets, Malleable Iron ...317, 318
Buckets, Steel 319
Ells, Union, Kewanee 32
Emergency Cases, Johnson's 718
Emery Cloth 491
Enclosed Fuses, Noark 746, 747
End Mills, Brown & Sharpe ...383, 384
Ends, Bolt 588
Engine Governors, Gardner 119–122
Information 774, 782
Oil 256, 257, 265
Replacers 522

Page

Engineers' Chisels 320
Fillers 252
Gauges, Starrett 485
Hammers 534
Levels, Starrett 482
Wrenches 322, 323, 327
Equipment, Garage, Weaver 699–705
Miners' 708
Exhaust Fans 557
Expanders, Tube, Boiler 279
Expansion Joints, Brass 65
Joints, Iron Body 65
Packing, Diagonal 233
Plates 61
Reamers, Cleveland 369
Shields, Machine Bolt 596
Tank Brackets, Ideal 156
Tanks, Galvanized 156
Expansive Bits 441
Extension Bars 60
Pieces, Malleable Iron 28
Extensions, Body, Auto 699
Valve Box 651
Extinguishers, Fire 224, 225
Extractors, Screw, Ezy-Out 374
Eyes, Pick, Coal 516
Pick, Drifting 516
Pick, Railroad 516
Pick, Surface 516

F

Fans, Exhaust 557
Farriers' Knives 545
Fasteners, Belt 200, 201
Strap, Hose 216
Tank Hoop 652
Fastenings, Rope, Wire 664, 665
Fastenings per Mile, Rail 523
per Ton, Rail 523
Feed Water Heating 772
Feeders, Water, Automatic 155
Felt, Hair 237
Felt and Roll Board, Asbestos, Non-Burn 237
Fence Nails 612
Wire 611
Ferrenewo Valves, Lunkenheimer.. 101
Ferrules, Boiler Tube, Copper..... 6
Figures, Steel 617
File Cards 424
Handles 424
Holders, Surface 424
File and Tool Handles 424
Files 418–423
Side, Saw 629
Fillers, Engineers' 252
Fillet Gauges, Starrett 484
Filters, Oil, Cross 260
Fine Nails 612
Finishing Nails 612
Fire Extinguishers 224, 225

Page

Fire Hoes 643
Hooks 643
Hose 211
Hydrants 650
Pots, Gasoline 274
Pots, Kerosene 274
Fireproof Paper, Corrugated, Asbestocel 237
Firing Tools 643
Firmer Chisels, Socket 436
Gouges, Socket 436
Firm-joint Calipers, Starrett..... 473
Fitted Sockets, Drill, Cleveland 355, 356
Fittings, Brass, Finished 70
Cast Iron, Extra Heavy.....45, 59
Cast Iron, Flanged, Extra Heavy 59
Cast Iron, Flanged, Standard.49–54, ... 57, 58
Cast Iron, Long Turn 46
Cast Iron, Screwed, Extra Heavy 45
Cast Iron, Screwed, Long Turn 46, 47
Cast Iron, Screwed, Standard...35, ... 37–44, 48
Cast Iron, Standard ...35–44, 48–55, ... 57, 58, 61
Hose 216–218
Hydraulic, Extra Heavy 29
Long Turn, Cast Iron 47
Malleable Iron 22–28, 30, 32–34
Malleable Iron, Extra Heavy .. 29
Malleable Iron, Screwed, Extra Heavy 29
Railing, Brass 69
Railing, Malleable Iron 68, 69
Screwed, Hydraulic, Extra Heavy 29
Fittings and Pipe Tongs, Chain, Agrippa 330
and Valves, Flanged, Drilling, Prices for 56
and Valves, Flanged, Drilling, Templates for 55
Foot Valves, Brass 110
Valves, Iron Body 110
Forge Blowers, Hand 554
Forges, Portable 551–553, 555, 556
Fork Handles 531
Forks, Rail 520
Foundry Brushes 633
Riddles 635
Flake Graphite, Dixon's 264
Flange Unions, Cast Iron 34
Unions, Dart 33
Unions, Malleable Iron 34
Flanged Couplings, Dodge 293
Fittings, Cast Iron, Extra Heavy 59
Fittings, Cast Iron, Standard..49–54, ... 57, 58
Valves and Fittings, Drilling, Prices for 56

Page

Flanged Valves and Fittings, Drilling, Templates for 55
Flanges, Cast Iron, Standard 48, 58
Companion, Cast Iron 59
Companion, Standard 57, 58
Pipe, Cast Iron 15
Pipe, Riveted, Spiral..... 11
Railing, Brass 69
Railing, Malleable Iron 69
Flanges and Bells, Pipe, Cast Iron.. 15
and Spigots, Pipe, Cast Iron.... 15
Flashlights, Eveready 748
Flasks, Carbide, Miners' Lamp 711
Flat Boxes, Common, Dodge 306
Flatters, Square 543
Flax Packing 231
Flexcord 730
Flexible Cord, Steel Armored 731
Joints, Moran 64
Flint Paper 491
Floor Cranes and Hoists, Portable.. 653
Flanges, Cast Iron, Standard .. 48
Flooring Nails 612
Flue Brushes 277
Brushes, Spiral 277
Brushes and Scrapers, Combination 277
Scrapers, Elliptical 277
Scrapers, Engineers' Favorite.. 277
Fluted Chucking Reamers, Cleveland 371
Shell Reamers, Cleveland 367
Flux, Welding 724
Frames, Grindstone 498
Saw, Hack 426, 427
Framing Chisels, Socket 436
Friction Board 259
Tape 738
Froes, Coopers' 516
Front and Lustre, Graphite 261
Fuel Information 776
Fullers, Blacksmiths'..... 543
Furnaces, Gasoline..... 274
Kerosene 274
Melting, Babbitt 272
Melting, Lead 272
Fuse, Safety 636
Fuse Plugs 734
Fuses, Blasting 637
Electrical 641
Enclosed, Noark 746, 747
Fusible Plugs 169

G

Garage Equipment, Weaver.....699–705
Presses 705
Garden Hose 205, 206
Hose Nozzles 219
Hose Valves, Brass 89
Gas Hose 214
Pipe 1, 2

Page

Gas Service Cocks, Brass.....62, 75
Gaskets Cutters 202
Gasket and Washer Cutters, Century 202
Gaskets, Asbestos 235
Cloth Inserted 235
Copper 236
McKim 236
Rubber 12
Sectional, Eclipse 234
Gasoline Furnaces 274
Torches 273
Gate Valves, Brass, Jenkins 92
Valves, Brass, Quick Opening.. 91
Valves, Brass, Standard 91
Valves, Brass, Williams 88
Valves, Bronze, Chapman 92
Valves, Bronze, Handy 90
Valves, Bronze, Lunkenheimer. 93
Valves, Hose, Brass 91
Valves, Iron Body, Handy 90
Valves, Iron Body, Lunkenheimer 104–106
Valves, Iron Body, Standard... 103
Gates, Blast, Western Chief 549
Gauge Cocks, Steam 167
Columns, Water 163
Glass Cutters 168
Glass Protectors, Gilbert..... 169
Glass Washers 169
Glasses, Scotch 168
Gauges, Altitude 171
Ammonia 172
Button, Starrett 467
Caliper, Micrometer, Starrett.. 472
Caliper, Starrett 467
Center, Starrett 486
Circumference, Starrett 467
Combination 163
Depth, Starrett 485
Draft, Ellison 176
Drill, Starrett 487
Fillet, Starrett 484
Hydraulic 172
Inspectors' Test 172
Portable 172
Pressure 170
Pressure, Water, Combination. 171
Pressure and Vacuum, Compound 171
Radius, Starrett 484
Scratch, Starrett 479
Screw Pitch, Starrett 483
Standard 759
Steam 170
Surface, Starrett 488
Tank, Expansion 165
Tap, Starrett 487
Taper, Starrett 485
Thickness, Starrett 485
Thread, Starrett 484
Track 521

Page
Gauges, U. S. Standard, Sizes of.. 750
Vacuum 170
Water, Penberthy 166
Water, Self-Cleaning 165
Wire, Starrett 487
Gear Cutters, Brown & Sharpe..... 379
Grease, Graphite, Mexican..... 263
Gearing Information 757
Gelatin, Du Pont..... 636
Generators, Heat, Honeywell..... 154
Gimlet Bits 441
Gimlets, Bell Hangers' 441
Electricians' 441
Gin Blocks, Wrought Iron..... 675
Glass Cutters, Gauge..... 168
Washers, Gauge 169
Glasses, Gauge, Scotch..... 168
Oil Cup 244
Globe Valves, Brass, Jenkins..... 79
Valves, Brass, Standard.....76, 78
Valves, Brass, Williams.85, 86, 107
Valves, Bronze, Lunkenheimer 81, 82
Valves, Iron Body, Extra Heavy 108
Valves, Iron Body, Jenkins.... 97
Valves, Iron Body, Jenkins Disc 95
Valves, Iron Body, Lunkenheimer 99–101
Valves, Iron Body, Medium.... 108
Valves, Iron Body, Standard... 94
Globes, Lantern 280
Gloves, Welders' 724
Goggles, Welders' 724
Gold Washing Pans, Miners'..... 709
Gong Pulls 179
Gongs, Trip 179
Gouges, Firmer, Socket..... 436
Governors, Engine, Gardner....119–122
Pump, Fisher 118
Pump, Strong 123
Grabler Hook Plates..... 61
Granite Board 259
Mining Candles 709
Graphite, Boiler, Mexican..... 262
Flake, Dixon's 264
Lubricating, U. S. 264
Cable Grease, Mexican..... 263
Cup Grease, Mexican..... 263
Gear Grease, Mexican..... 263
Journal Grease, Mexican..... 263
Paint 261
Products, U. S. 261
Grapple Hooks 615
Grate Bars 642
Grease, Albany 265
Axle 256
Cable, Graphite, Mexican..... 263
Cup 265
Cup, Graphite, Mexican..... 263
Cup, Polarine 257, 258
Gear, Graphite, Mexican..... 263
Journal, Graphite, Mexican.... 263

Page
Grease Cups, Brass.....240–243
Cups, Steel 240, 242
Grinder Countershafts 506
Grinders, Hand, American..... 507
Hand, Champion 507
Grinding Compound, Alundum..... 267
Compound, Crystolon 267
Machines, St. Louis..... 506
Wheel Dressers 505
Wheels, Alundum-Crystolon ... 502
Wheels, Norton 499–502
Wheels, Standard 503, 504
Grindstone Frames 498
Grindstones 497, 498
Grip Sockets, Drill, Cleveland..... 356
Grocery Trucks 692
Grooving Saws, Huther..... 625
Ground Key Bibbs.....73, 74
Key Stop Cocks.....71, 72
Key Stop and Waste Cocks...71, 72
Grub Hoes 517
Guards, Lamp 745
Guide Liners, Locomotive..... 479
Gum Core Packing..... 233
Gummer Cutters, Saw..... 631
Gummers, Saw 630, 631
Guy Wire, Galvanized..... 663

H

Hack Saw Blades.....425, 428
Saw Frames 426, 427
Hair Felt 237
Half and Half Solder..... 270
Hammer Handles 539, 541
Hammers, Blacksmiths' 534
Bricklayers' 533
Bush 535
Chipping 533
Colvin 532
Drilling 536
Engineers' 534
Hide-faced 532
Machinists' 534
Mason 535
Nail 533
Napping 536
Prospectors' 709
Set 543
Spauling 535
Stone Cutters' 535
Striking 535
Tinners' 533
Hand Drill Points..... 444
Drills 444–446
Grinders, American 507
Grinders, Champion 507
Jacks, Steam Gauge..... 173
Lamps, Malleable Iron..... 254
Lever Punches 453
Reamers, Cleveland 370
Saws 622

Page
Hand Taps, Machinists'.....387, 388
Tools, Diamond 505
Handled Axes, Double-Bit..... 537
Axes, Single-Bit 537
Handles, Adze 539–541
Axe 539–541
Carpenter, House 540
File 424
File and Tool..... 424
Fork 531
Hammer 539, 541
Hatchet 539, 541
Mattock 539
Maul 539–541
Micrometer, Starrett 471
Pick 539–541
Post Maul 540
Railroad 540
Scoop 531
Ship 540
Shovel 531
Sledge 540, 541
Spade 531
Tool 540, 541
Handpowers 654, 655
Hanger Bearings, Dodge..... 305
Screws 580
Hangers, Ball and Socket, Dodge 295–301
Drop, Dodge 295–299
Pipe 60
Post, Dodge 295, 300, 301, 305
Post, Pioneer 304
Shafting, Pioneer 302–304
Hard Metal, Ulco..... 269
Hardies, Blacksmiths' 543
Hatchet Handles 539, 541
Hatchets, Broad 538
Claw 538
Half 538
Lathing 538
Shingling 538
Haulage Rope, Wire..658, 659, 661, 662
Heading Tools 543
Heads, D Handle..... 530
Dado, Huther 625
Drill, Extension 596
Heat Generators, Honeywell..... 154
Regulators, Minneapolis ...152, 153
Heaters, Laundry 140
Tank, Sunray 140
Water, Steam 184
Heating Boilers, Capitol....129–134, 139
Boilers, Capitol-Winchester 135–138
Hose, Car 205
Information, House 767, 768
Hemp Packing 231, 232
Hermaphrodite Calipers, Starrett.. 476
Hinge Nails 612
Hinges, Strap 614
T 614
Hoes, Fire 643

Page
Hoes, Grub 517
Palmetto 517
Vineyard 517
Hoisting Blocks, Metal..... 672
Blocks, Safety, Star..... 676
Blocks, Steel 671, 674
Blocks, Wood 668, 670
Blocks, Wrought Iron..... 673
Rope, Wire 658–662
Hoists, Auto, Weaver..... 702
Chain, Yale 678–685
Electric, Yale 686
Hoists and Cranes, Floor, Portable. 653
Holders, Bit, Extension..... 443
File, Surface 424
Tool, Lathe, Armstrong....414–417
Tool, Lathe, O. K. 412, 413
Hook Plates 61
Rules, Starrett 461
Hooks, Beam 61
Belt 196
Cant 615
Chain, Vulcan 666
Chandelier, Malleable Iron.... 28
Claw 643
Fire 643
Lug 615
Hooks and Thimbles, Wire Rope... 664
Hoops, Tank 652
Horizontal Check Valves, Brass, Jenkins 80
Check Valves, Brass, Standard 77, 78
Check Valves, Brass, Williams. 87
Check Valves, Bronze, Lunkenheimer 83, 84
Check Valves, Iron Body, Jenkins 98
Check Valves, Iron Body, Lunkenheimer 102
Check Valves, Iron Body, Standard 96
Check Valves, Iron Body, Williams 109
Horseshoe Nails 545
Turning Sledges 536
Hose, Acetylene 724
Air 214
Brake, Air 205
Brewers' 205
Bronze 214
Deck 205
Drill, Air 205, 210, 213
Fire 211
Garden 206
Gas 214
Heating, Car 205
Metal 214
Mill 211
Oil 214
Oxygen 724
Pneumatic 210

Page

Hose, Pump 205
Steam 205–207, 212, 214
Steel 214
Suction 208, 213, 214
Tool, Pneumatic 213
Water 205, 207, 209
Wire Lined 213
Hose Bibbs, Ground Key.....73, 74
Bushings 217
Clamps 216
Connections, Siamese 217
Couplings 214, 216, 218
Fittings 216–218
Gate Valves, Brass..... 91
Menders 218
Nipples 217
Nozzles 219
Pipes 219, 220
Racks 221, 222
Reducers 217
Reels 223
Rings, Expansion 218
Spanners 217
Strap Fasteners 216
Straps 216
Valves, Brass 89
Winding 213
Hot Water Thermometers..... 156
House Carpenter Handles..... 540
Heating Information 767, 768
Humidifiers, Buddington 157
Hydrants, Fire 650
Hydraulic Fittings, Extra Heavy... 29
Fittings, Screwed, Extra Heavy 29
Gauge Check Valves..... 173
Gauges 172
Packing 233
Packing, Rawhide 231
Pipe, Riveted 9
Relief Valves, Brass..... 115

I

Increasers, Pipe, Cast Iron..... 15
Indicators, Speed, Starrett..... 490
Test, Starrett 489
Information, Useful 752–783
Ingots, Copper 270
Injector Strainers 184
Injectors, Penberthy 180, 181
U. S. 182
Inside Micrometers, Starrett..... 471
Inspectors' Lamps 715
Test Gauges 172
Torches 254
Insulating Tape 738
Insulators, Glass, Brookfield..... 734
Porcelain, Split 732
Iron, Sheet, Weights of..... 606
Strength of 766
Weights of 598

Page

Iron Body Angle Valves, Extra Heavy 108
Body Angle Valves, Jenkins... 97
Body Angle Valves, Jenkins Disc 95
Body Angle Valves, Lunkenheimer 99–101
Body Angle Valves, Medium... 108
Body Angle Valves, Standard.. 94
Body Blow-off Valves, Lunkenheimer 113
Body Butterfly Valves..... 90
Body Check Valves, Angle, Jenkins 98
Body Check Valves, Angle, Lunkenheimer 102
Body Check Valves, Angle, Williams 109
Body Check Valves, Horizontal, Jenkins 98
Body Check Valves, Horizontal, Lunkenheimer 102
Body Check Valves, Horizontal, Williams 96, 109
Body Check Valves, Swing, Jenkins 98
Body Check Valves, Swing, Standard 96
Body Check Valves, Swing, Williams 109
Body Check Valves, Vertical, Standard 96
Body Cross Valves, Extra Heavy 108
Body Cross Valves, Jenkins.... 97
Body Cross Valves, Lunkenheimer 99–101
Body Cross Valves, Medium... 108
Body Cross Valves, Standard.. 94
Body Foot Valves..... 110
Body Gate Valves, Lunkenheimer 104–106
Body Gate Valves, Standard... 103
Body Globe Valves, Extra Heavy 108
Body Globe Valves, Jenkins... 97
Body Globe Valves, Jenkins Disc 95
Body Globe Valves, Lunkenheimer 99–101
Body Globe Valves, Medium... 108
Body Globe Valves, Standard.. 94
Body Pop Safety Valves..... 114
Body Throttle Valves..... 90
Body Valves, Extra Heavy..... 108
Body Valves, Jenkins.....97, 98
Body Valves, Lunkenheimer.99–102
Body Valves, Regrinding, Williams 109
Body Valves, Standard....90, 94–96
Body Valves, Williams..... 109
Body Water Relief Valves..... 115
Cement, Smooth-On 266
Fittings, Malleable 21

Page

Iron Planes, Bailey 620
Irons, Tuyere 549, 550
Windlass, Hand 654
Irrigating Information 783
Shovels 527

J

Jack Screws, Little Giant..... 480
Screws, Vulcan 511
Jacks, Auto, Barrett..... 512
Barrett 510
Boilermakers' 508
Builders' 508
Car 509
Carpenters' 508
General Purpose 508
Hand, Steam Gauge..... 173
Joyce 513
Lever 510, 513
Lowering, Automatic 510
Norton 508, 509
Track 510
Trip 510
Truck, Barrett 512
Truckmen's 508
Twin, Auto, Weaver..... 700
Weaver 700, 703
Jaws, Drill Chuck, Standard..... 404
Jet Pump Repairs..... 184
Pumps 184
Joint Clamps, Pipe, Skinner..... 63
Runners 271
Joints, Expansion, Brass..... 65
Expansion, Iron Body..... 65
Flexible, Moran 64
Swing, Brass 64
Journal Bearings, Dodge..... 306
Grease, Graphite, Mexican.... 263
Jute Packing 231, 232
Twine 232

K

Kerosene Furnaces 274
Torches 273
Keyhole Saws 621
Keys, Drill Chuck, Standard..... 404
Riveted 566
Spring 566
Whitney 565
Key-seat Clamps, Starrett..... 486
Rules, Starrett 486
Key-seaters, Portable 282
Key-seating Millers 282
Pulleys, Dodge 286
Shafting 283
Knife Switches 740–742
Knives, Farriers' 545

L

Lace Cutters 195
Leather 195

Page

Lacing, Belt, Metallic..... 195
Belt, Steel 196–199
Cut 195
Ladles, Melting 271
Lag Screws 580
Lamp Guards 745
Wick, Ball 717
Lamps, Drivers' 715
Hand, Malleable Iron..... 254
Inspectors' 715
Mazda 749–751
Miners' l. T. P. 714, 715
Miners', Justrite 710–712
Miners', Pioneer 714
Miners', Sun Ray..... 714
Safety, Miners', Wolf..... 713
Steel 254
Trip 715
Lantern Globes 280
Lanterns 280
Lap Welded Casing..... 8
Lard Oil 265
Laterals, Cast Iron, Standard..... 53
Lathe Chucks, Cushman.....405, 406
Dog Wrenches 408
Dogs 407–409
Tool Cutter Bits..... 410
Tool Cutters 411
Tools, Armstrong 414–417
Tools, Diamond 505
Tools, O. K. 412, 413
Lathing Hatchets 538
Laundry Heaters 140
Lead, Pig 270
Lead Burning Outfits, Imperial.... 723
Roofing Washers 698
Siding Washers 698
Leading Wire, Blasting..... 637
Leather, Lace 195
Leather Belt Cement..... 193
Belting 186, 187
U Cups 226
Leathers, Cylinder 226
Plunger, Crimped 226
Valve 226
Leg Vises 351
Letters, Steel 617
Levels, Bench, Starrett..... 481
Cross-test, Starrett 482
Electricians', Starrett 481
Engineers', Starrett 482
Plumbers', Starrett 482
Pocket, Starrett 481
Protractors and Rules, Combined 458
Track 521
Levels and Plumbs, Stanley..... 434
and Spot Boards, Combined.... 521
Lever Jacks 510, 513
Snips 634
Throttle Valves 90
Lighting Switches 742
Lights, Flash, Eveready..... 748

Page
Line Pipe 3
Linemen's Rules 456
Liners, Guide, Locomotive..... 479
Lining Bars 519
Link Chain, Detachable.....310–313
List, Drill 357
Lock Washers 587
Lock-joint Calipers, Starrett..... 473
Locknut Nipples 16
Threads 16
Locknuts, Brass, Finished..... 70
Cast Iron, Standard.....39, 42
Malleable Iron 28
Locks, Pad, Yale.....618, 619
Locomotive Firing Scoops..... 530
Guide Liners 479
Jack Screws, Vulcan..... 511
Picks 515
Torches 254
Long Handle Shovels..... 526
Lowering Jacks, Automatic..... 510
Lubricant, Mining Machinery..... 262
Lubricating Compound, Albany.... 265
Graphite, U. S. 264
Oil 257
Oil, Gargoyle 255, 256
Oil, Polarine 258
Lubricators, Bronze, Lunkenheimer 246
Sight-feed, Detroit 248, 249
Sight-feed, Lunkenheimer 247
Lug Hooks 615
Lugs, Tank 652
Terminal 733
Lumber Crayons 616
Lumbering Tools 615
Lustre, Front, End, Graphite..... 261

M

Machine Bits 438, 440
Bolts 590, 591
Countersinks, Cleveland 366
Oil 265
Screw Nuts 584
Screw Taps 388, 389
Screws, Brass 579
Screws, Iron 578
Taps 390
Machines, Blasting 637
Boring, Angular 441
Cutting, Pipe, Forbes..... 344
Drilling, Hardsocg 639
Grinding, St. Louis 506
Polishing, St. Louis..... 505
Threading, Oster 341
Threading, Pipe, Forbes..... 344
Machinists' Clamps 408, 409
Hammers 534
Hand Taps 387, 388
Scrapers 424
Screwdrivers 432
Vises 345–349
Magnesia Cement 237

Page
Magnolia Metal 268
Malleable Iron Fittings.21–28, 30, 32–34
Fittings, Extra Heavy..... 29
Fittings, Screwed, Extra Heavy 29
Flange Unions 34
Railing Fittings 68, 69
Unions 32
Mallets, Rawhide 532
Mandrels, Saw, American..... 632
Manifolds 35
Manila Rope 656
Marking Crayons 616
Marlin Twine 232
Mason Hammers 535
Match Boxes, Waterproof..... 711
Mattock Handles 539
Mattocks, Asphalt 516
Bush 516
Camping 516
Nursery 516
Pick 515
Short Cutter 515
Maul Handles 539–541
Mauls, Coal 535
Spike 536
Mazda Lamps 749–751
Measures, Tables of..... 753
Measures and Weights, Table of... 769
Measuring Tapes 454, 455
Melting Furnaces, Babbitt..... 272
Furnaces, Lead 272
Ladles 271
Menders, Hose 218
Metal, Babbitt 268, 269
Hard, Ulco 269
Magnolia 268
Metal Cored Bars, Magnolia..... 268
Hose 214
Slitting Saws, Brown & Sharpe 386
Meters, Water 649
Metric Information 754
Micrometers Calipers, Starrett.468, 470,
..... 472
Sets, Starrett 470
Micrometers, Inside, Starrett..... 471
Mill Crayons, Empire..... 616
Hose 211
Millboard, Sheet, Asbestos..... 237
Millers, Key-seating 282
Milling Cutters, Brown & Sharpe
.....375–378
Mills, End, Brown & Sharpe....383, 384
Mineral Wool 237
Miners' Candles 709
Candlesticks 709
Caps 711, 716
Checks 717
Gold Washing Pans..... 709
Lamps, I. T. P. 714, 715
Lamps, Justrite 710–712
Lamps, Pioneer 714
Lamps, Sun Ray..... 714
Riddles, Coal 635

Page

Miners' Safety Lamps, Wolf..... 713
Supplies 708
Tools 641
Mining Candles, Granite..... 709
Picks 514
Shovels 526, 527
Wire Cloth 607, 608
Mitre, Squares 435
Mobiloil 255, 256
Molders' Bellows 545
Shovels 528
Monkey Wrenches 327, 328
Motors, Heat Regulator, Minneapolis Westinghouse 743, 744
Movers, Car, Samson..... 518

N

Nail Hammers 533
Nails, Horseshoe 545
Wire, Steel 612
Name Stamps, Steel..... 617
Napping Hammers 536
Needles, Steel 641
Nests of Saws..... 621
Neverleak, Boiler 142
Nickel 270
Nippers, Cutting, End.....429, 431
Nipples, Hose 217
Locknut 16
Pipe 19, 20
Noark Enclosed Fuses.....746, 747
Nozzles, Hose 219
Nursery Mattocks 516
Nut Taps 390
Wrenches 328
Nuts, Castle 583
Cold Punched 581
Hot Pressed 582
Lock, Brass, Finished..... 70
Lock, Cast Iron, Standard...39, 42
Lock, Malleable Iron..... 28
Machine Screw 584
Plain 583
Semi-finished 583
Thumb 584
Waste, Malleable Iron..... 28

O

Oakum 259
Oil, Compressor 257
Cylinder 256, 265
Engine 256, 257, 265
Lard 265
Lubricating 257
Lubricating, Gargoyle 255, 256
Lubricating, Polarine 258
Machine 265
Thread-cutting 256
Oil Cup Corks..... 244
Cup Glasses 244
Cups, Glass 244, 245

Page

Oil Cups, Locomotive 244
Fitters, Cross 260
Hose 214
Pumps, Hand 250
Separators, Cochrane 127
Stones, India 492–496
Oiler Sets, Engineers'..... 252
Oilers, Bench 251
Brass 151, 252
Pit Car 253
Pump 251, 253
Railroad 252
Steel 251, 252
Weaver 701
Old Man 451
Ore Picks 514
Outfits, Burning, Lead, Imperial.... 723
Cutting, Imperial 719, 721, 722
Decarbonizing, Imperial .....719, ...721, 722
Welding, Imperial 719–722, 724
Oxygen Hose 724
Regulators, Imperial 719

P

Packing, Expansion, Diagonal..... 233
Flax 231
Gum Core 233
Hemp 231, 232
Hydraulic 233
Hydraulic, Rawhide 231
Jute 231, 232
Piston 233
Piston, Massco 229
Ring 233
Rope, Asbestos 232
Rubber Back 233
Rubber Core 233
Sheet 227, 228
Wick, Asbestos 232
Wick, Candle 232
Packing Tools 320
Padlocks, Yale 618, 619
Paint, Graphite 261
Palmetto Hoes 517
Pans, Washing, Gold, Miners'..... 709
Paper, Blasting, Waterproof..... 641
Fireproof, Corrugated, Asbestocel 237
Flint 491
Sand 491
Parallels, Adjustable, Starrett..... 480
Patch Bolt Taps..... 392
Bolts, Boiler 595
Peavies, Socket 615
Phosphor Tin 270
Pick Eyes, Coal..... 516
Eyes, Drifting 516
Eyes, Railroad 516
Eyes, Surface 516
Handles 539–541
Mattocks 515

Page

Picks, Boiler 514
Coal 515
Concrete 515
Contractors' 514
Drifting 514
Locomotive 515
Mining 514
Ore 514
Poll 514
Prospecting 709
Prospectors' 514
Quarry 515
Railroad 514
Stone 515
Surface 514
Tamping 514
Pieces, Extension, Malleable Iron.. 28
Pig Lead 270
Tin 270
Pillow Blocks, Dodge.....306–308
Pin Vises, Starrett..... 479
Pins, Cotter 566
Dowel 612
Rawhide 199
Steel 199
Taper 567
Wheel, Cutter, Nye..... 333
Pipe, Black 1, 2
Cast Iron, Specials for.....14, 15
Cast Iron, Weights of..... 13
Coated 1, 2, 9
Cutting 16
Drive 3
Galvanized 1, 2
Gas 1, 2
Hydraulic, Riveted 9
Line 3
O. D. 4
Riveted, Spiral, American..... 10
Steam 1, 2
Threading 16
Water 1, 2, 9
Water, Flanged 13
Pipe Bends, Welded, Lap..... 17
Bolts, Spiral 12
Cement, Graphite 261
Clamps, Emergency 63
Covering 238, 239
Cutters, Barnes 332
Cutters, Nye 333
Cutters, Saunders 332
Cutters, Trimo 332
Cutting Machines, Forbes..... 344
End Reamers 393
Flanges, Riveted, Spiral..... 1
Hangers 60
Joint Clamps, Skinner..... 63
Nipples 19, 20
Reamers 392
Stocks and Dies, Armstrong 338, 339
Stocks and Dies, Hart's....342, 343
Stocks and Dies, Malleable.... 334

Page

Pipe Stocks and Dies, Oster....340, 341
Stocks and Dies, Toledo....335–337
Taps 392
Taps, and Drills, Combined.... 390
Threading Machines, Forbes... 344
Threading Machines, Oster.... 341
Threading Tools, Armstrong 338, 339
Threading Tools, Hart's ...342, 343
Threading Tools, Malleable... 334
Threading Tools, Oster....340, 341
Threading Tools, Toledo...335–337
Tongs, Chain, Vulcan..... 330
Vises 350, 353
Wrenches, Chain, Champion... 331
Wrenches, Stillson 329
Wrenches, Trimo 329
Pipes, Hose 219, 220
Play 220
Piston Packing 233
Packing, Massco 229
Pit Car Oilers..... 253
Planer Chucks, Skinner..... 352
Head Bolts 588
Tools 410
Tools, O. K. 412, 413
Planes, Iron, Bailey..... 620
Wood, Bailey 620
Plates, Brazing, Laffitte..... 276
Expansion 61
Hook 61
Screw, Little Giant.....395, 396
Screw, O. K. 397–399
Wall, Malleable Iron..... 28
Welding, Laffitte 276
Platform Scales, Howe..... 694
Play Pipes 220
Pliers, Burner 429, 431
Cutting 429
Diagonal Cutting 430
Flat Nose 430, 431
Gas 429, 431
Long Reach 430
Milliners' 430
Round Nose 431
Side Cutting 430
Slip Joint 430
Plow Bolts 589
Plug Cocks, Asbestos Packed..... 112
Cut-outs 734
Punches, Tie 520
Plugs, Attachment 733
Brass, Finished 70
Cast Iron, Standard.....39, 42
Fuse 734
Fusible 169
Pipe, Cast Iron..... 14
Plumb Bobs, Starrett..... 482
Plumbers' Levels, Starrett..... 482
Plumbs and Levels, Stanley..... 434
Plunger Leathers, Crimped..... 226
Pneumatic Hose 210
Tool Hose 213

Page
Points, Ball, Starrett 477
Hand Drill 444
Trammel, Starrett 478
Polarine 258
Poles, Towing, Auto 699
Polishing Heads, St. Louis 505
Machines, St. Louis 505
Poll Picks 514
Pop Safety Valves, Brass 114
Safety Valves, Iron Body 114
Porcelain Cleat Receptacles 737
Cleats 733
Insulators, Split 732
Sockets 735
Tubes 732
Post Drills, Buffalo 559–561
Drills, Hardsocg 638
Drills, Western Chief 562, 563
Hangers, Dodge .. 295, 300, 301, 305
Hangers, Pioneer 304
Maul Handles 540
Posts, Drilling 451
Pots, Fire, Gasoline 274
Fire, Kerosene 274
Pouring 271
Solder 271
Tallow, Steel 252
Pouring Pots 271
Powder, Brazing, Laffitte 276
Welding, Laffitte 276
Power Machine Bits 440
Pump Information 770, 773
Presses, Drill, Bench 448
Garage 705
Pressure Blowers 557, 558
Gauges 170
Gauges, Water, Combination ... 171
Regulating Valves, Davis 117
Regulating Valves, Foster 116
Regulating Valves, Strong 123
Regulator Diaphragms 227
Pressure and Vacuum Gauges, Compound 171
Prices for Drilling Flanged Valves and Fittings 56
Prospecting Picks 709
Prospectors' Hammers 709
Picks 514
Protectors, Gauge Glass, Gilbert's .. 169
Protractors, Levels and Rules, Combined 458
Starrett 465, 466
Pruning Saws 621
Puller Clamps, Weaver 703
Pulley Bushings, Wood Split, Dodge 286
Information 756
Pulleys, Key-seating, Dodge 286
Steel, Split, National 287
Steel, Split, Oneida 288–290
Wood, Split, Dodge 284, 285
Pulls, Gong 179
Pump Diaphragms 227
Governors, Fisher 118

Page
Pump Governors, Strong 123
Hose 205
Information 770, 773, 777
Oilers 251, 253
Suction 227
Valves, Massco 229, 230
Pumps, Bucket, Valveless 701
Centrifugal, Goulds 647
Double-acting, Pyramid, Goulds 648
Force, Double-acting, Challenge 645
Force, Rotary, Goulds 646
Jet 184
Oil, Hand 250
Suction, Diaphragm, Goulds 644
Punches, Belt 203
Brick 437
Center 437
Hand 437
Hand Lever 453
Pin 437
Plug, Tie 520
Round 543
Steel Screw 452
Track 520

Q

Quarry Picks 515
Quick-opening Gate Valves, Brass .. 91
Gate Valves, Iron Body, Lunkenheimer 104

R

Racks, Hose 221, 222
Radiator Air Valves 161, 162
Traps 157
Valves 158–160
Radiators, Cast Iron, ... 143–151
Ornamental, Cast Iron 143–146
Wall, Cast Iron 148–151
Window, Cast Iron 147
Radius Gauges, Starrett 484
Rail Benders 522
Fastenings per Mile 523
Fastenings per Ton 523
Forks 520
Tongs 520
Railing Fittings, Brass 69
Fittings, Malleable Iron 68, 69
Railroad Adzes 517
Handles 540
Oilers 252
Pick Eyes 516
Picks 514
Spikes 524
Track Shovels 526, 527
Trucks 692
Unions 32
Rails, Steel, Weight per Mile 523
Rasps 419, 422
Ratchet Braces 442
Twist Drills Cleveland 664

Page
Ratchet Wrenches, Keystone..450, 451
Ratchets Drilling, Keystone 449–451
Drilling, Monarch 450
Reamer Fluting Cutters, Brown & Sharpe 380
Grooving Cutters, Brown & Sharpe 380
Wrenches 394
Reamers, Belt 204
Bit Stock, Cleveland 373
Bridge, Taper, Cleveland 372
Burring 393
Center, Cleveland 366
Chucking, Fluted, Cleveland.... 371
Chucking, Rose, Cleveland 371
Expansion, Cleveland 369
Hand, Cleveland 370
Pipe 392
Pipe End 393
Shell, Fluted, Cleveland..... 367
Shell, Rose, Cleveland..... 367
Square Shank, Cleveland 372
Taper Pin, Cleveland..... 373
Taper Shank, Cleveland ...371, 372
Taper Socket, Cleveland 373
Tip, Miners' Lamps 711
Receptacles, Cleat, Porcelain..... 737
Reducers, Cast Iron, Standard..... 39, ... 42, 54
Hose 217
Malleable Iron 28
Pipe, Cast Iron 15
Reducing Companion Flanges, Standard 58
Couplings, Cast Iron, Standard 44
Reels, Hose 223
Regitherms, Sylphon, Ideal 155
Regrinding Brass Valves, Williams. 107
Bronze Valves, Lunkenheimer.. 81, ... 83, 113
Iron Body Valves, Lunkenheimer 101
Iron Body Valves, Williams 109
Swing Check Valves, Lunkenheimer 84
Regulating Valves, Foster 116
Valves, Pressure, Davis 117
Valves, Pressure, Foster 116
Valves, Pressure, Strong 123
Regulator Diaphragms, Pressure... 227
Regulators, Acetylene, Imperial.... 719
Damper, Clark 155
Damper, Low Pressure..... 155
Heat, Minneapolis 152, 153
Oxygen, Imperial 719
Sylphon, Ideal 155
Relief Valves, Cylinder, Brass 115
Valves, Water, Brass 115
Valves, Water, Iron Body..... 115
Renewo Bronze Valves, Lunkenheimer 82
Replacers, Car 522
Engine 522

Page
Return Bends, Brass, Finished..... 70
Bends, Cast Iron, Standard 43
Bends, Malleable Iron..... 27
Riddles, Foundry 635
Miners', Coal 635
Ridge Rolls 698
Rigid Bearings, Dodge 305
Ring Packing 233
Rings, Hose, Expansion 218
Rivet, Cement, Smooth-On 266
Sets 204
Riveted Keys 566
Pipe, Spiral, American 10
Rivets 568, 569
Boiler 569
Copper 204
Crescent 200
Structural 569
Rock Drill Sharpening Tools..... 544
Rods, Brass 66
Welding 724
Roll Board and Asbestos Felt, Non-Burn 237
Rolls, Ridge 698
Roofing, Corrugated 696–698
Crimped 698
Standing Seam 698
Roofing Nails 612
Washers, Lead 698
Rope, Columbian 656
Haulage, Wire ...658, 659, 661, 662
Hoisting, Wire 658–662
Manila 656
Standing, Wire 660
Tiller 657
Transmission, Wire ...658–660, 662
Wire, Cast Steel..... 662
Wire, Elevator 660
Wire, Galvanized 663
Wire, Hercules 658, 659
Wire, Plough Steel 661
Rope Fastenings, Wire 664, 665
Packing, Asbestos 232
Rose Chucking Reamers, Cleveland 371
Shell Reamers, Cleveland 367
Rosettes, Fuseless 734
Round Boilers, Capitol-Winchester 135–137–139
Punches 543
Rubber Back Packing 233
Belting 188–191
Core Packing 233
Sockets 735
Rule Clamps, Starrett 486
Rules, Caliper, Starrett 461
Flexible, Starrett 459
Folding 456
Hook, Starrett 461
Key-seat, Starrett 486
Levels and Protractors, Combined 458
Linemen's 456
Lufkin 456–458

Page
Rules, Narrow, Starrett 459
Semi-flexible, Starrett 459
Shrinkage 458
Spring-tempered, Starrett 459
Steel, Foldng 458
Steel, Starrett 460, 461
Thumb, Slide, Starrett 461
Zigzag 457
Runners, Joint 271

S

S Wrenches 324
Wrenches, Adjustable 328
Safety Collars, Dodge 291
Fuse 636
Lamps, Miners', Wolf 713
Valves, Pop, Brass 114
Valves, Pop, Iron Body 114
Water Columns 164
Sand Paper 491
Screens 635
Sash Cords 657
Saw Blades, Hack 425, 428
Frames, Hack 426, 427
Gummer Cutters 631
Gummers 630, 631
Mandrels, American 632
Sets, Morrill's 629
Side Files 629
Swages, Conqueror 631
Saws, Back 621
Band 624
Circular 626, 628
Compass 621
Crosscut 623
Grooving, Huther 625
Hand 622
Keyhole 621
Nests of 621
Pruning 621
Slitting, Metal, Brown & Sharpe 386
Scales, Dormant, Howe 695
Platform, Howe 695
Scoop Handles 531
Scoops, D Handle 529
Locomotive Firing 530
Scrapers, Bearing 321
Carbon 321
Double End 641
Drag 690
Flue, Elliptical 277
Flue, Engineers Favorite 277
Machinists' 424
Scrapers and Brushes, Coil, Combined 277
and Brushes, Flue, Combination 277
Scraping Tools 320, 321
Scratch Brushes 633
Gauges, Starrett 479
Screen Sieves 609
Screens, Coal 635
Sand 635

Page
Screw Chasers 392
Extractors, Ezy-Out 374
Pitch Gauges, Starrett 483
Plates, Little Giant 395, 396
Plates, O. K. 397–399
Slotting Cutter Arbors 381
Slotting Cutters, Brown & Sharpe 385
Taps, Machine 389
Screwdrivers, Cabinet Makers 432
Hurwood 432
Machinists' 432
Stanley 432
Yankee 433
Screwed Fittings, Cast Iron, Extra Heavy 45
Fittings, Cast Iron, Long Turn 46, 47
Fittings, Cast Iron, Standard.. 35, ... 37–44, 48
Fittings, Hydraulic, Extra Heavy 29
Fittings, Malleable Iron, Extra Heavy 29
Screws, Cap 573–577
Coach 580
Hanger 580
Jack, Little Giant 480
Jack, Vulcan 511
Lag 580
Machine, Brass 579
Machine, Iron 578
Set, Allen 571
Set, Iron 570
Set, Mac-It 572
Set, Standco 571
Skein 580
Thumb 584
Scribers, Starrett 479
Scutches, Bricklayers' 533
Sectional Boilers, Capitol..129–134, 139
Separators, Oil, Cochrane 127
Steam, Austin..... 128
Steam, Cochrane 127
Service Cooks, Gas, Brass 62, 75
Set Hammers 543
Screw Wrenches 571
Screws, Allen 571
Screws, Iron 570
Screws, Mac-It 572
Screws, Standco 571
Sets, Micrometer, Starrett 470
Oiler, Engineers' 252
Rivet 204
Saw, Morrill's 629
Wrench, Drop-forged 326
Shafting, Key-seating 283
Steel, Horse Power of..... 762
Steel, Standard 281
Shafting Boxes, Dodge 306
Collars, Hallowell 292
Fittings, Dodge...291, 293, 295–301, ... 305–308

Page
Shafting Fittings Pioneer.....302–304
Fittings, Shaw 294
Hangers, Pioneer 302–304
Keys and Cutters 565
Shanks, Circular Saw 627
Shaper Tools 410
Sharpening Stones, India 492–496
Tools, Rock Drill 544
Shears, Bench 634
Sheaves, Block, Snatch 669
Block, Tackle 669
Sheet Iron, Weights of 606
Iron Information 760
Millboard, Asbestos 237
Packing 227, 228
Steel, Weights of 606
Steel Information 760
Zinc 270
Shell Drill Arbors, Cleveland..... 368
Reamer Arbors, Cleveland 368
Reamers, Fluted, Cleveland 367
Reamers, Rose, Cleveland 367
Shields, Expansion, Machine Bolt.. 596
Shingle Nails 612
Shingling Hatchets 538
Ship Augers 438, 440
Handles 540
Short Cutter Mattocks 515
Shovel Handles 531
Shovels, Coal 528
Coal, Mining Machine..... 529
Coke 528
Ditching 527
Irrigating 527
Long Handle 526
Mining 526, 527
Molders' 528
Track, Railroad 526, 527
Shrinkage Rules 458
Side Files, Saw 629
Tools, Armstrong 416
Siding, Corrugated 696, 697
Siding Nails 612
Washers, Lead 698
Sieves, Screen 609
Sight-feed Lubricators, Detroit.248, 249
Lubricators, Lunkenheimer.... 247
Silver Solder 270
Single Bit Drills 641
Siphon Cocks 173
Siphons, Coil Pipe 173
Radiator 173
Skein Screws 580
Skids 639
Slating Nails 612
Sledge Handles 540, 541
Sledges, Blacksmiths' 536
Coal 535
Cross Pein 536
Horseshoe, Turning 536
Stone 535
Sleeve Sockets, Drill, Cleveland.355, 356
Sleeves, Pipe, Cast Iron 14, 15

Page
Sleeves, Socket, Drill, Cleveland.355, 356
Slice Bars 643
Slide Calipers, Pocket, Starrett.... 467
Slitting Saws, Metal, Brown & Sharpe 386
Slotting Cutters, Screw, Brown & Sharpe 385
Smooth-On Compound 266
Snap Switches 736
Snatch Block Sheaves 669
Blocks, Steel 670
Blocks, Tarbox 670, 673
Blocks, Wire Rope 673
Blocks, Wood 670
Snips, Lever 634
Tinners' 634
Socket Cabinet Chisels 436
Firmer Chisels 436
Firmer Gouges 436
Framing Chisels 436
Peavies 615
Sockets, Bragden 735
Composition 735
Drill, Perfect Double Tang 355
Drill, Taper Shank, Cleveland 355, 356
Drill, Use-Em-Up 354
Fitted, Drill, Cleveland 355, 356
Grip, Drill, Cleveland 356
Porcelain 735
Rubber 735
Sleeve, Drill, Cleveland 355, 356
Weatherproof 735
Wire Rope 664
Solder, Half and Half 270
Silver 270
Spelter 270
Wiping 270
Wire 270
Solder Pots 271
Soldering Coppers 634
Solid Dies, Hexagon, G. T. D..... 400
Dies, Square, G. T. D..... 400
Spade Handles 531
Spades, D Handle 530
Spanners, Hose 217
Spauling Hammers 535
Specials for Cast Iron Pipe.....14, 15
Speed Indicators, Starrett..... 490
Spelter 270
Spelter Solder 270
Spigots and Flanges, Pipe, Cast Iron 15
Spike Mauls 536
Spikes 612
Boat 524
Railroad 524
Track 524
Spindles, Steel 199
Splicing Compound 738
Split Steel Pulleys, National..... 287
Steel Pulleys, Oneida 288–290
Wood Pulleys, Dodge 284, 285
Spot Boards and Levels, Combined. 521

Page
Spreaders, Tire, Weaver 704
Spring Cotters 566
Dividers, Starrett 474
Keys 566
Sprinkling Hose, Street 205
Sprocket Wheels 314–316
Spud Wrenches, Ideal 156
Square Flatters 543
Shank Reamers, Cleveland 372
Squares, Caliper, Starrett..... 467
Carpenters', Starrett 462, 463
Center, Starrett 464
Combination Starrett..... 464
Diemakers', Starrett 463
Double, Starrett 462
Mitre 435
Steel 435
Steel, Starrett 462, 463
Try 435
Try, Starrett 462
Squares and Bevel Protractors, Combination 465
Stamps, Name, Steel 617
Standard Gauges 759
Threads 761
Standing Rope, Wire 660
Stands, Caliper, Micrometer, Starrett 472
Starting Switches 742
Stay Bolt Taps 391
Steam Cock Wrenches 62, 75
Cocks, Brass 62, 75
Cocks, Iron 111
Gauge Hand Jacks 173
Gauges 170
Hose 205–207, 212, 214
Information 774, 776
Pipe 1, 2
Pump Information 770, 773, 781
Separators, Austin..... 128
Separators, Cochrane 127
Thermometers 156
Traps, Nason 126
Traps, Strong 124
Traps, Wright 125
Water Heaters 184
Whistles 177, 178
Steel, Cold Rolled 601
Self-hardening, Armstrong 417
Sheet, Weights of 606
Weights of 598
Steel Bars, Weight of 602, 603
Classification, Standard ...599, 600
Classification, Tool 604
Hose 214
Information 766
Needles 641
Pulleys, Split, National 287
Pulleys, Split, Oneida 288–290
Rails, Weight per Mile 523
Shafting, Horse Power of..... 762
Shafting, Standard 281
Steels, Drill, Crescent 605

Page
Stocking Cutters, Brown & Sharpe 381
Stocks, Bit, Angular 443
Stocks and Dies, Pipe, Armstrong 338, 339
Pipe, Hart's 342, 343
Pipe, Malleable 334
Pipe, Oster 340, 341
Pipe, Toledo 335–337
Stone Axes 535
Cutters' Hammers 535
Picks 515
Sledges 535
Stones, Grind 497, 498
Oil, India 492–496
Sharpening, India 492–496
Stop Cocks, Ground Key 71, 72
Stop and Waste Cocks, Ground Key 71, 72
Storage Tanks, Hot Water 141
Stove Bolt Taps 389
Bolts 593
Stoves, Laundry 140
Straight Edges, Starrett 460
Shank Twist Drills, Cleveland 360–363
Strainers, Ejector 184
Injector 184
Strap Fasteners, Hose 216
Hinges 614
Straps, Hose 216
Street Sprinkling Hose 205
Striking Hammers 535
Structural Rivets 569
Wrenches 325
Stud Bolts 594
Suction Hose 208, 213, 214
Pump Diaphragms 227
Tees 184
Supplies, Miners' 708
Surface Gauges, Starrett 488
Pick Eyes 516
Picks 514
Switches 736
Swage Blocks 542
Swages, Blacksmiths' 543
Saw, Conqueror 631
Swing Check Valves, Brass, Jenkins 80
Check Valves, Brass, Standard 77
Check Valves, Brass, Williams 87
Check Valves, Iron Body, Jenkins 98
Check Valves, Iron Body, Standard 96
Check Valves, Iron Body, Williams 109
Check Valves, Regrinding, Lunkenheimer 84
Joints, Brass 64
Switch Bases 742
Switches, Knife 740–742
Surface 736
Swivel Couplings 64
Vises 349, 350

Page

Sylphon Regitherms, Ideal 155
Regulators, Ideal 155
Systems, Anchoring, Cinch 597

T

T Hinges 614
Tackle Block Sheaves 669
Blocks, Metal, Tarbox 672
Blocks, Safety, Star 676
Blocks, Steel 671
Blocks, Wire Rope 674
Blocks, Wood 668
Tallow Pots, Steel 252
Tamping Bars 519, 641
Picks 514
Tank Brackets, Expansion, Ideal.. 156
Gauges, Expansion 165
Heaters, Sunray 140
Hoop Fasteners 652
Hoops 652
Lugs 652
Tanks, Expansion, Galvanized..... 156
Storage, Hot Water 141
Tap Chucks 394
Gauges, Starrett 487
Grooving Cutters, Brown & Sharpe 380
Wrenches 394
Tape, Cable 738
Friction 738
Insulating 738
Taper Gauges, Starrett 485
Pin Reamers, Cleveland 373
Pins 567
Reducers, Cast Iron, Standard.. 54
Shank Reamers, Cleveland.371, 372
Shank Twist Drills, Cleveland 358, 359
Socket Reamers, Cleveland.... 373
Tapes, Measuring 454, 455
Taps, Bit Brace 391
Boiler 392
Bolt, Stove 389
Hand, Machinists' 387, 388
Machine 390
Machine Screw 388
Nut 390
Patch Bolt 392
Pipe 392
Screw, Machine 389
Stay Bolt 391
Taps and Drills, Pipe, Combined.. 390
Tee Bars 643
Tees, Branch 643
Brass, Finished 70
Cast Iron, Extra Heavy 45
Cast Iron, Long Turn 46, 47
Cast Iron, Standard .....36, 37, 41, ... 44, 51
Hydraulic, Extra Heavy 29
Malleable Iron 25, 26
Malleable Iron, Extra Heavy ... 29

Page

Tees, Pipe, Cast Iron.....14, 15
Railing, Brass 69
Railing, Malleable Iron.....68, 69
Suction 184
Union, Kewanee 32
Union, Malleable Iron 30
Tempering Steel 766
Templates for Drilling Flanged Valves and Fittings 55
Terminal Lugs 733
Test Indicators, Starrett 489
Testers, Center, Starrett..... 489
Thermometers, Hot Water 156
Steam 156
Thermostats, Minneapolis 152
Thickness Gauges, Starrett 485
Thimbles, Wire Rope 665
Thread Calipers, Starrett 474
Gauges, Starrett 484
Thread-cutting Oil 256
Threading Machines, Oster 341
Machines, Pipe, Forbes..... 344
Pipe 16
Tools, Armstrong 415
Tools, O. K. 413
Tools, Pipe, Armstrong 338, 339
Tools, Pipe, Hart's 342, 343
Tools, Pipe, Malleable 334
Tools, Pipe, Oster 340, 341
Tools, Pipe, Toledo 335–337
Threads, Locknut 16
Standard 761
Throttle Valves, Brass 90
Valves, Iron Body 90
Thumb Nuts 584
Screws 584
Tie Plug Punches..... 520
Tongs 520
Tighteners, Belt, Dodge 309
Tiller Rope 657
Timber Carriers 615
Time Attachments, Heat Regulator, Minneapolis 152
Tin, Bar 270
Phosphor 270
Pig 270
Tinners' Hammers 533
Snips 634
Tip Reamers, Miners' Lamp 711
Tire Changers, Weaver 704
Spreaders, Weaver 704
Tobacco Nails 612
Tongs, Blacksmiths' 548
Bolt 548
Curved Lip 548
Gad 548
Horseshoers' 548
Pick-up 548
Pipe, Chain, Vulcan..... 330
Pipe and Fittings, Chain, Agrippa 330
Rail 520
Rivet 548

Page
Tongs, Tie 520
Tool Handles 540, 541
Hose, Pneumatic 213
Steel Classification 604
Tool and File Handles..... 424
Toolmakers' Calipers, Starrett..... 475
Clamps, Starrett 480
Dividers, Starrett 475
Tools, Boring, Armstrong.....414, 415
Boring, O. K. 412, 413
Cutting, O. K. 413
Cutting-Off, Armstrong 416
Hand, Diamond 505
Heading 543
Lathe, Armstrong 414–417
Lathe, Diamond 505
Lathe, O. K. 412, 413
Lumbering 615
Packing 320
Planer, O. K. 412, 413
Scraping 320, 321
Sharpening, Rock Drill..... 544
Side, Armstrong 416
Starrett 459–490
Threading, Armstrong 415
Threading, O. K. 413
Threading, Pipe, Armstrong 338, 339
Threading, Pipe, Hart's....342, 343
Threading, Pipe, Malleable.... 334
Threading, Pipe, Oster.....340, 341
Threading, Pipe, Toledo....335–337
Track 514, 515, 519–521
Top Rings, Cock, Asbestos Packed.. 112
Torches, Alcohol 273
Blow 273
C & L..... 273
Combination, Imperial 719
Cutting, Imperial 719
Gasoline 273
Inspectors 254
Kerosene 273
Locomotive 254
Steel 254
Welding, Imperial 719
Towing Poles, Auto..... 699
Track Bolts 525
Chisels 520
Drills 522
Gauges 521
Jacks 510
Levels 521
Punches 520
Shovels, Railroad 526, 527
Spikes 524
Tools 514, 515, 519–521
Wrenches 520
Trammel Points, Starrett..... 478
Trammels, Starrett 478
Transfer Calipers, Starrett..... 473
Transmission Rope, Wire..658–660, 662
Traps, Radiator 157
Steam, Nason 126

Page
Traps, Steam, Strong 124
Steam, Wright 125
Trip Gongs 179
Jacks 510
Lamps 715
Trolleys, Brownhoist 685, 687
Truck Jacks, Barrett..... 512
Truckmen's Jacks 508
Trucks, Bag 692
Barrel 692
Box 693
Grocery 692
Portable 724
Railroad 692
Warehouse 692
Try Squares 435
Squares, Starrett 462
Tube Brushes, Wire, Expansion.... 277
Cleaners, Boiler 278
Cleaners, Steam 277
Expanders, Boiler 279
Tubes, Boiler 15
Porcelain 732
Tubing, Brass, Seamless.....66, 67
Steel Seamless 7
Tubing Couplings 18
Turnbuckles 667
Tuyere Irons 549, 550
Twin Jacks, Auto, Weaver..... 700
Twine, Jute 232
Marlin 232
Twist Drills, Bit Stock, Cleveland.. 364
Drills, Blacksmiths' Cleveland. 365
Drills, Cleveland 358–366
Drills, Ratchet, Cleveland..... 364
Drills, Straight Shank, Cleveland 360–363
Drills, Taper Shank, Cleveland 358, 359
Drills, Wire Gauge, Cleveland. 363

U

U Cups, Leather..... 226
U. S. Standard Gauges, Sizes of.... 758
Union Carbide 717
Elbows 33, 160
Elbows, Malleable Iron..... 30
Ells, Kewanee 32
Tees, Kewanee 32
Tees, Malleable Iron..... 30
Unions, Air Pump..... 33
Brass, Finished 70
Dart 33
Flange, Cast Iron..... 34
Flange, Dart 33
Flange, Malleable Iron..... 34
Jefferson 32
Kewanee 32
Malleable Iron 32
Mark 32
Railroad 32
Standard 32

Page

Units, Electrical 772
Useful Information 752–783

V

Vacuum Gauges 170
Vacuum and Pressure Gauges, Compound 171
Valve Box Bases..... 651
Box Covers 651
Box Extensions 651
Boxes 651
Discs, Jenkins 79
Leathers 226
Wheels, Wood 160
Valves, Air, Radiator.....161, 162
Angle, Brass, Jenkins..... 79
Angle, Brass, Standard.....76, 78
Angle, Brass, Williams..85, 86, 107
Angle, Bronze, Lunkenheimer 81, 82
Angle, Iron Body, Extra Heavy 108
Angle, Iron Body, Jenkins..... 97
Angle, Iron Body, Jenkins Disc 95
Angle, Iron Body, Lunkenheimer 99–101
Angle, Iron Body, Medium..... 108
Angle, Iron Body, Standard.... 94
Blow-off, Bronze, Lunkenheimer 113
Blow-off, Iron Body, Lunkenheimer 113
Blow-off, Lunkenheimer 113
Brass, Extra Heavy, Williams 87, 107
Brass, Jenkins 79, 80
Brass, Regrinding, Williams... 107
Brass, Standard 76–78, 89, 90
Brass, Williams 85–87, 107
Bronze, Extra Heavy, Lunkenheimer 81
Bronze, Lunkenheimer 81–84
Bronze, Regrinding, Lunkenheimer 83, 113
Bronze, Renewo, Lunkenheimer 82
Butterfly, Brass 90
Butterfly, Iron Body..... 90
Check, Brass, Angle, Jenkins.. 80
Check, Brass, Angle, Standard 77, 78
Check, Brass, Angle, Williams. 87
Check, Brass, Ball, Standard... 77
Check, Brass, Ball, Williams.. 87
Check, Brass, Horizontal, Jenkins 80
Check, Brass, Horizontal, Standard 77, 78
Check, Brass, Horizontal, Williams 87
Check, Brass, Swing, Jenkins.. 80
Check, Brass, Swing, Standard. 77
Check, Brass, Swing, Williams 87
Check, Brass, Vertical, Standard 77
Check, Brass, Vertical, Williams 87

Page

Valves, Check, Bronze, Angle, Lunkenheimer 83, 84
Check, Bronze, Ball, Lunkenheimer 83
Check, Bronze, Horizontal, Lunkenheimer 83, 84
Check, Bronze, Vertical, Lunkenheimer 83
Check, Hydraulic Gauge..... 173
Check, Iron Body, Angle, Jenkins 98
Check, Iron Body, Angle, Williams 109
Check, Iron Body, Horizontal, Jenkins 98
Check, Iron Body, Horizontal, Lunkenheimer 102
Check, Iron Body, Horizontal, Standard 96
Check, Iron Body, Horizontal, Williams 109
Check, Iron Body, Lunkenheimer 102
Check, Iron Body, Swing, Jenkins 98
Check, Iron Body, Swing, Standard 96
Check, Iron Body, Swing, Williams 109
Check, Iron Body, Vertical, Standard 96
Check, Swing, Regrinding, Lunkenheimer 84
Cross, Brass, Jenkins..... 79
Cross, Brass, Standard.....76, 78
Cross, Brass, Williams...85, 86, 107
Cross, Bronze, Lunkenheimer.. 81
Cross, Iron Body, Extra Heavy 108
Cross, Iron Body, Jenkins..... 97
Cross, Iron Body, Lunkenheimer 99–101
Cross, Iron Body, Medium..... 108
Cross, Iron Body, Standard.... 94
Ferrenewo, Lunkenheimer 101
Foot, Brass 110
Foot, Iron Body..... 110
Gate, Brass, Jenkins..... 92
Gate, Brass, Quick Opening... 91
Gate, Brass, Standard..... 91
Gate, Brass, Williams..... 88
Gate, Bronze, Chapman..... 92
Gate, Bronze, Handy..... 90
Gate, Bronze, Lunkenheimer.. 93
Gate, Hose, Brass..... 91
Gate, Iron Body, Handy..... 90
Gate, Iron Body, Lunkenheimer 104–106
Gate, Iron Body, Standard..... 103
Globe, Brass, Jenkins..... 79
Globe, Brass, Standard.....76, 78
Globe, Brass, Williams..85, 86, 107
Globe, Bronze, Lunkenheimer 81, 82
Globe, Iron Body, Extra Heavy 108

Page
Valves, Globe, Iron Body, Jenkins. 97
Globe, Iron Body, Jenkins Disc 95
Globe, Iron Body, Lunkenheimer 99–101
Globe, Iron Body, Medium..... 108
Globe, Iron Body, Standard.... 94
Hose, Brass 89
Iron Body, Extra Heavy..... 108
Iron Body, Jenkins.....97, 98
Iron Body, Regrinding, Williams 109
Iron Body, Standard.....90, 94–96
Iron Body, Williams..... 109
Iron Body, Lunkenheimer...99–102
Pump, Massco 229, 230
Radiator 158–160
Regulating, Foster 116
Regulating, Pressure, Davis... 117
Regulating, Pressure, Foster.. 116
Regulating, Pressure, Strong.. 123
Relief, Cylinder, Brass..... 115
Relief, Water, Brass..... 115
Relief, Water, Iron Body..... 115
Safety, Pop, Brass..... 114
Safety, Pop, Iron Body..... 114
Throttle, Brass 90
Throttle, Iron Body..... 90
Whistle 177
Valves and Fittings, Flanged, Drilling, Prices for..... 56
and Fittings, Flanged, Drilling, Templates for 55
Vertical Bronze Check Valves, Lunkenheimer 83
Check Valves, Brass, Standard 77
Check Valves, Brass, Williams. 87
Check Valves, Iron Body, Standard 96
Vineyard Hoes 517
Vises, Adjustable, Millers Falls.... 448
Armstrong 353
Bulldog 348, 349
Chipping 346
Columbian 351
Drill Press 352
Graham 352
Leg 351
Machinists' 345–349
Parker 345
Pin, Starrett 479
Pipe 350, 353
Pipe, Chain 353
Prentiss 348–350
Skinner 352
Starrett 346, 347
Swivel 349, 350
Vulcan 353
Woodworkers' 348
Volume Blowers 557

W

Wall Bracket Hangers, Pioneer.... 304
Plates, Malleable Iron..... 28
Page
Warehouse Trucks 692
Washer Cutters 202
Washer and Gasket Cutters, Century 202
Washers, Bibb 74
Bolt 588
Cast Iron 585
Glass, Gauge 169
Lock 587
Malleable Iron 586
Roofing, Lead 698
Siding, Lead 698
Wrought Iron 585
Washing Pans, Gold, Miners'..... 709
Waste, Cotton, Colored..... 259
Cotton, White 259
Wool 259
Waste Nuts, Malleable Iron..... 28
Watchmen's Clocks, Portable..... 185
Water, Measurement of..... 777
Water Columns, Reliance..... 164
Feeders, Automatic 155
Gauge Columns 163
Gauges, Penberthy 166
Gauges, Self-Cleaning 165
Heaters, Steam 184
Hose 205, 207, 209
Meters 649
Pipe 1, 2, 9
Pipe, Flanged 13
Pressure Gauges, Combination. 171
Pressure Information 771
Relief Valves, Brass..... 115
Relief Valves, Iron Body..... 115
Weatherproof Sockets 735
Weights, Iron 598
Sheet Iron 606
Sheet Steel 606
Steel 598
Steel Bars 602, 603
Tables of 753
Weights and Measures, Table of... 769
Welders' Gloves 724
Goggles 724
Welding Compound, Borax-ette.... 275
Compound, Cherry Heat..... 275
Compound, Climax 275
Compound, E-Z 275
Flux 724
Outfits, Imperial 719–722, 724
Plates, Laffitte 276
Powder, Laffitte 276
Torches, Imperial 719
Wheel Pins, Cutter, Nye..... 333
Wheelbarrows 688, 689
Wheels, Cutter, Nye..... 333
Grinding, Alundum-Crystolon 500–502
Grinding, Norton 499–502
Grinding, Standard 503, 504
Sprocket 314–316
Valve, Wood 160
Whistle Valves 177

Page
Whistles, Steam 177, 178
Whitney Cutters 565
Keys 565
Wick, Lamp, Ball..... 717
Wick Packing, Asbestos..... 232
Packing, Candle 232
Winches, Hand 654
Winding, Hose 213
Windlasses, Hand 654, 655
Wiping Solder 270
Wire, Brass 610
Copper 610
Copper, Weatherproof 729
Duplex 637
Fence 611
Guy, Galvanized 663
Leading, Blasting 637
Rubber Covered 726
Steel 611
Wire Brooms 633
Brushes, Pilley's 633
Cloth, Mining 607, 608
Cutters 429
Gauge Dimensions 752
Gauge Twist Drills, Cleveland.. 363
Gauges, Starrett 487
Hooks and Thimbles..... 664
Lined Hose 213
Nails, Steel 612
Rope, Cast Steel..... 662
Rope, Elevator 660
Rope, Galvanized 663
Rope, Hercules 658, 659
Rope, Plough Steel..... 661
Rope Clamps 665
Rope Fastenings 664, 665
Rope Gin Blocks..... 675
Rope Sockets 664
Rope Thimbles 665
Solder 270
Wood Planes, Bailey..... 620
Pulleys, Split, Dodge.....284, 285
Split Pulley Bushings, Dodge.. 286
Woodworkers' Vises 348

Page
Wool, Mineral 237
Wool Waste 259
Wrench Sets, Drop-forged..... 326
Wrenches, Bemis & Call..... 327
Cap Screw 577
Car 325
Coes 327
Construction 325
Engineers' 322, 323, 327
Lathe Dog 408
Monkey 327, 328
Nut 328
Pipe, Chain, Champion..... 331
Pipe, Stillson 329
Pipe, Trimo 329
Ratchet, Keystone 450, 451
Reamer 394
S 324
S, Adjustable 328
Set Screw 571
Spud, Ideal 156
Steam Cock 62, 75
Stillson 328
Structural 325
Tap 394
Track 520
Trimo 327
Wrought Iron Couplings..... 18

Y

Y Bends, Brass, Finished..... 70
Bends, Cast Iron, Standard.... 39
Branches, Cast Iron, Extra Heavy 45
Branches, Cast Iron, Standard 41, 53
Branches, Malleable Iron..... 26
Branches, Pipe, Cast Iron..... 15
Yankee Drills 446
Tools 433

Z

Zinc 270

INDEX TO FIGURE NUMBERS

The illustrations in this catalogue are grouped by pages. All the illustrations on a given page are designated by the same number, being distinguished from each other by the addition of different letters.

To locate any figure, ignore the letter, and find the figure number in the first column. Thus, to give Fig. 4833B merely look up 4833 which is to be seen on page 97.

Fig. No.	Page
1	1
14	14
21	35
24	49
28	52
30	57
45	19
92	54
146	667
185	579
187	590
188	592
273	614
314	166
340	136
341	181
346	134
348	362
376	512
458	575
470	580
550	435
585	124
611	90
621	175
639	18
649	182
655	254
659	681
666	685
672	680
675	683
721	63
722	46
723	47
725	50
727	169
732	70
749	94
751	149
761	96
766	110
784	115
785	65
787	174
806	333
807	620
839	128
890	148
916	150
918	151
950	213
963	187
982	247
1030	270
1031	568
1048	249
1051	390
1143	582
1145	581
1148	594
1151	573
1194	320
1286	361
1295	523
1302	624
1312	105
1346	629
1375	690
1383	539
1414	664
1422	668
1427	674
1566	498
1637	418
1669	439
1719	73
1737	612
1756	635
1826	434
1862	482
1868	402
1969	652
2049	192
2059	214
2191	33
2328	203
2412	474
2413	473
2516	170
2552	132
2573	104
2588	625
2603	665
2683	239
2706	509
2748	403
2750	508
2960	440
2975	288
2983	322
2984	323
3084	679
3134	678
3139	682
3152	34
3153	74
3207	356
3269	646
3278	61
3343	140
3394	343
3473	359
3474	358
3525	8
3627	78
3655	405
3679	221
3692	13
3706	48
3740	626
3742	534
3760	349
3845	80
3861	236
3923	306
3962	154
3963	10
3994	40
3995	41
3998	43
4039	155
4043	404
4060	410
4077	648
4084	411
4117	100
4253	621
4311	543
4318	490
4331	205
4340	651
4461	85
4490	387
4591	363
4785	99
4817	183
4832	66
4833	97
4836	91
4842	167
4878	550
4882	218
4905	217
5021	135
5031	71
5050	125
5089	173
5122	291
5123	293
5127	307
5260	310
5279	662
5370	395
5408	309
5422	283
5425	273
5437	274
5524	687
5531	558
5536	660
5556	661
5565	419
5567	670
5569	569
5570	595
5577	158
5598	647
5602	69
5637	459
5639	461
5640	460
5641	464
5642	462
5643	463
5645	466
5646	469
5647	471
5648	470
5649	476
5650	477
5651	478
5652	487
5653	485
5654	489
5655	488
5657	481
5663	113
5675	451
5676	450
5705	130
5720	138
5734	137
5735	532
5783	143
5784	144
5785	145
5786	146
5787	147
5844	82
5849	248
5857	412
5912	354
5938	545
5962	330
6087	171
6119	98
6212	319
6291	329
6337	59
6343	324
6356	326
6385	240
6403	156
6463	334
6540	342
6557	178
6594	645
6604	304
6630	653
6643	112
6654	116
6656	118
6694	467
6704	72
6723	650
6731	561
6794	353
6805	222
6934	340
6954	6
6955	341
7080	449
7089	219
7104	344

Fig. No.	Page
7114	375
7115	376
7116	377
7117	383
7119	386
7120	385
7123	380
7125	282
7127	379
7129	531
7142	675
7186	608
7193	392
7242	510
7247	164
7253	120
7273	672
7280	180
7375	292
7376	577
7390	24
7391	25
7392	26
7393	27
7394	28
7414	302
7428	348
7488	79
7558	389
7570	141
7574	538
7575	524
7576	89
7629	407
7630	409
7685	279
7699	617
7746	370
7749	585
7780	560
7783	196
7795	586
7888	162
7960	658
7994	525
8056	200
8105	305
8109	557
8141	68
8175	578
8250	265
8273	548
8291	216
8294	686
8297	659
8308	355
8322	496
8323	597
8327	338
8336	339
8389	202
8453	278
8508	101
8514	613
8583	423
8617	159
8681	55
8723	42
8781	275
8794	583
8848	45
8869	388
8908	195
8934	81
8948	15
8949	123
8951	287
8963	246
9014	117
9027	119
9067	103
9117	296
9118	297
9119	300
9122	284
9124	286
9137	114
9149	179
9213	325
9231	671
9309	666
9593	126
9639	559
9668	233
9670	231
9684	131
9697	441
9702	644
9731	384
9745	332
9756	163
9774	371
9778	372
9779	367
9801	58
9850	391
9871	364
9902	567
9911	266
9943	237
10074	152
10075	153
10234	32
10253	572
10395	177
10500	276
10603	106
10624	649
10703	133
10748	518
10775	95
10825	294
11086	51
11094	53
11155	601
11269	87
11417	566
11570	587
11599	564
12014	610
12028	109
12247	570
12265	259
12338	630
12455	631
12464	424
12556	643
12571	565
12580	185
13175	588
13176	584
13263	633
13273	596
13300	215
13329	88
13379	673
13445	176
13515	30
13709	533
13805	547
13813	263
13925	497
14152	235
14161	108
14322	465
14373	615
14389	220
14447	632
14522	111
14627	636
14803	746
14805	747
15105	432
15188	522
15305	519
15330	520
15501	456
15505	396
15535	16
15561	731
15596	107
15661	716
15669	732
15675	458
15676	457
15796	60
15836	347
15838	346
15978	744
16063	743
16283	374
16375	331
16486	369
16806	198
16807	199
17085	161
17287	742
17288	740
17289	741
17475	426
17515	642
17518	696
17523	695
17534	427
17552	194
17574	698
17579	697
17605	76
17853	268
18222	430
18280	129
18400	260
18651	168
18700	44
18733	486
18734	484
18753	277
18971	472
18972	483
19011	576
19070	468
19075	475
19080	616
19101	314
19107	605
19200	574
19239	414
19240	415
19241	416
19246	417
19305	739
19319	720
19320	721
19321	722
19334	160
19375	709
19414	406
19529	715
19704	714
19752	31
19767	676
19991	751
20793	5
21395	281
21630	507
21655	253
21725	656
21855	351
21864	227
21887	428
21899	677
21999	393
22112	397
22476	399
22670	593
22671	172
22785	638
22848	327
22861	77
22957	641
22994	84
23059	83
23063	264
23065	271
23072	637
23089	75
23090	62
23100	337
23102	3
23103	165
23106	335
23107	336
23112	408
23337	555
23456	251
23457	252
23489	562
23493	563
23529	184
23562	29
23570	542
23577	429
23580	318
23623	226
23635	553
23638	12
23719	452
23734	549
23746	92
23945	551
23971	267
23994	717
23998	102
24015	718
24057	546
24076	691

Fig. No.	Page
24116	571
24164	93
24168	127
24225	366
24238	193
24248	521
24251	479
24256	480
24262	9
24267	350
24305	223
24422	373
24424	713
24465	368
24471	317
24506	360
24514	365
24595	241
24596	242
24609	634
24628	443
24630	445
24631	444
24632	442
24637	438
24660	244
24661	245
24811	261
24813	243
24909	448
24952	401
25018	622
25080	446
25108	142
25161	511
25198	272
25347	657
25357	663
25494	688
25514	282
25741	692
25743	693
25836	64
25841	250
25944	225
25991	694
25998	639
26000	640
26232	689
26282	711
26283	712
26289	400
26345	234
26395	86
26416	623
26593	398
26640	589
26645	710
26698	537
26791	748
27013	514
27014	516
27029	517
27033	515
27141	454
27143	455
27162	708
27273	232
27688	431
27708	745
27738	728
27739	727
27740	726
27741	729
27742	737
27743	736
27746	735
27850	750
27879	394
27916	749
27998	352
28039	730
28577	436
29640	535
29641	536
29650	157
29679	506
29767	453
29780	378
30095	381
30170	345
30351	544
30353	328
30354	186
30359	447
30374	607
30388	197
30414	544
30415	526
30416	527
30417	529
30418	530
30419	552
30420	556
30422	280
30423	528
30445	505
30544	627
30548	628
30577	256
30578	255
30605	190
30606	188
30607	191
30657	655
30658	654
30661	619
30676	230
30677	229
30773	258
30774	206
30775	207
30776	208
30777	209
30778	210
30779	211
30780	269
30845	262
30881	618
30922	425
30970	734
31029	738
31141	733
31180	513
31334	204

STANDARD STEAM, GAS AND WATER PIPE

BLACK AND GALVANIZED

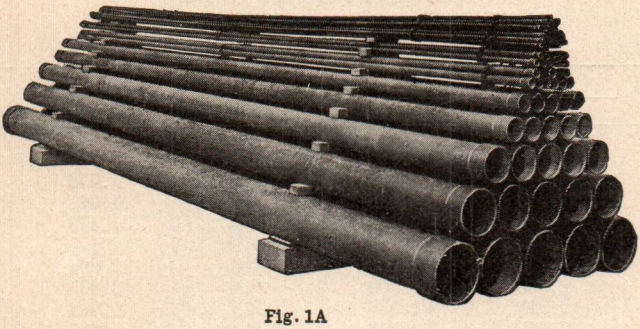


Fig. 1A

AS ADOPTED JANUARY 1, 1913

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size Inches	Price per Foot	Diameter Inches		Thickness Inches	Weight, per Foot Pounds		Number of Threads per Inch
		External	Internal		Plain Ends	Threaded and Coupled	
1/8	.05½	.405	.269	.068	.244	.245	27
1/4	.06	.540	.364	.088	.424	.425	18
3/8	.06	.675	.493	.091	.567	.568	18
1/2	.08½	.840	.622	.109	.850	.852	14
3/4	.11½	1.050	.824	.113	1.130	1.134	14
1	.17	1.315	1.049	.133	1.678	1.684	11½
1¼	.23	1.660	1.380	.140	2.272	2.281	11½
1½	.27½	1.900	1.610	.145	2.717	2.731	11½
2	.37	2.375	2.067	.154	3.652	3.678	11½
2½	.58½	2.875	2.469	.203	5.793	5.819	8
3	.76½	3.500	3.068	.216	7.575	7.616	8
3½	.92	4.	3.548	.226	9.109	9.202	8
4	1.09	4.500	4.026	.237	10.790	10.889	8
4½	1.27	5.	4.506	.247	12.538	12.642	8
5	1.48	5.563	5.047	.258	14.617	14.810	8
6	1.92	6.625	6.065	.280	18.974	19.185	8
7	2.38	7.625	7.023	.301	23.544	23.769	8
8	2.50	8.625	8.071	.277	24.696	25.	8
8	2.88	8.625	7.981	.322	28.554	28.809	8
9	3.45	9.625	8.941	.342	33.907	34.188	8
10	3.20	10.750	10.192	.279	31.201	32.	8
10	3.50	10.750	10.136	.307	34.240	35.	8
10	4.12	10.750	10.020	.365	40.483	41.132	8
11	4.63	11.750	11.	.375	45.557	46.247	8
12	4.50	12.750	12.090	.330	43.773	45.	8
12	5.07	12.750	12.	.375	49.562	50.706	8
13	5.60	14.	13.250	.375	54.568	55.824	8
14	6.10	15.	14.250	.375	58.573	60.375	8
15	6.50	16.	15.250	.375	62.579	64.500	8

The permissible variation in weight is 5 per cent above and 5 per cent below.

Furnished with threads and coupling and in random lengths, unless otherwise ordered.

For cut lengths, an extra charge will be made above random lengths.

For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe.

For galvanized or coated pipe, an extra charge will be made above black.

STEAM, GAS AND WATER PIPE

BLACK AND GALVANIZED

ADOPTED JANUARY 1, 1913

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

EXTRA STRONG

Size Inches	Diameter, Inches		Thickness Inches	Weight, per Foot Plain Ends Pounds	Price per Foot
	External	Internal			
1/8	.405	.215	.095	.314	.12
1/4	.540	.302	.119	.535	.07½
3/8	.675	.423	.126	.738	.07½
1/2	.840	.546	.147	1.087	.11
3/4	1.050	.742	.154	1.473	.15
1	1.315	.957	.179	2.171	.22
1¼	1.660	1.278	.191	2.996	.30
1½	1.900	1.500	.200	3.631	.36½
2	2.375	1.939	.218	5.022	.50½
2½	2.875	2.323	.276	7.661	.77
3	3.500	2.900	.300	10.252	1.03
3½	4.	3.364	.318	12.505	1.25
4	4.500	3.826	.337	14.983	1.50
4½	5.	4.290	.355	17.611	1.80
5	5.563	4.813	.375	20.778	2.08
6	6.625	5.761	.432	28.573	2.86
7	7.625	6.625	.500	38.048	3.81
8	8.625	7.625	.500	43.388	4.34
9	9.625	8.625	.500	48.728	4.90
10	10.750	9.750	.500	54.735	5.48
11	11.750	10.750	.500	60.075	6.10
12	12.750	11.750	.500	65.415	6.55

The permissible variation in weight is 5 per cent above and 5 per cent below.

DOUBLE EXTRA STRONG

Size Inches	Diameter, Inches		Thickness Inches	Weight, per Foot Plain Ends Pounds	Price per Foot
	External	Internal			
1/2	.840	.252	.294	1.714	.32
3/4	1.050	.434	.308	2.440	.35
1	1.315	.599	.358	3.659	.37
1¼	1.660	.896	.382	5.214	.52½
1½	1.900	1.100	.400	6.408	.65
2	2.375	1.503	.436	9.029	.91
2½	2.875	1.771	.552	13.695	1.37
3	3.500	2.300	.600	18.583	1.86
3½	4.	2.728	.636	22.850	2.30
4	4.500	3.152	.674	27.541	2.76
4½	5.	3.580	.710	32.530	3.26
5	5.563	4.063	.750	38.552	3.86
6	6.625	4.897	.864	53.160	5.32
7	7.625	5.875	.875	63.079	6.35
8	8.625	6.875	.875	72.424	7.25

The permissible variation in weight is 10 per cent above and 10 per cent below.

The following notes apply to both tables:

Furnished with plain ends and in random lengths, unless otherwise ordered.

Random length of extra strong and double extra strong pipe is considered to be 12 feet to 22 feet, we to have the privilege, however, of supplying not exceeding 5 per cent of total order in lengths from 6 to 12 feet.

For pipe fitted with threads and couplings; for cut lengths, or galvanized or coated pipe, an extra charge will be made.

LINE PIPE AND DRIVE PIPE

STANDARD LINE PIPE

Fig. 23102A

STANDARD DRIVE PIPE

Fig. 23102B

ADOPTED JANUARY 1, 1913

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

LINE AND DRIVE PIPE

Size Inches	Diameter, Inches External	Internal	Thickness Inches	Weight, per Foot, Pounds Plain Ends	Threaded and Coupled Line Pipe	Threaded and Coupled Drive Pipe	Threads per Inch	Price, per Foot †Line Pipe	Drive Pipe
⅛	.405	.269	.068	.244	.246	.....	27	**.06**	*....
¼	.540	.364	.088	.424	.426	.....	18	**.06½**	*....
⅜	.675	.493	.091	.567	.571	.....	18	**.06½**	*....
½	.840	.622	.109	.850	.856	.....	14	**.09**	*....
¾	1.050	.824	.113	1.130	1.138	.....	14	**.12**	*....
1	1.315	1.049	.133	1.678	1.688	.....	11½	**.17½**	*....
1¼	1.660	1.380	.140	2.272	2.300	.....	11½	**.23½**	*....
1½	1.900	1.610	.145	2.717	2.748	.....	11½	**.28**	*....
2	2.375	2.067	.154	3.652	3.716	3.730	11½	**.37½**	....
2½	2.875	2.469	.203	5.793	5.881	5.906	8	**.59**	....
3	3.500	3.068	.216	7.575	7.675	7.705	8	**.77**	....
3½	4.000	3.548	.226	9.109	9.261	9.294	8	**.93**	....
4	4.500	4.026	.237	10.790	10.980	10.995	8	**1.10**	....
4½	5.000	4.506	.247	12.538	12.742	12.758	8	**1.28**	....
5	5.563	5.047	.258	14.617	14.966	14.989	8	**1.50**	....
6	6.625	6.065	.280	18.974	19.367	19.408	8	**1.94**	....
7	7.625	7.023	.301	23.544	23.975	24.021	8	**2.40**	....
8	8.625	8.071	.277	24.696	25.414	25.495	8	**2.54**	....
8	8.625	7.981	.322	28.554	29.213	2 .303	8	**2.92**	....
8	8.625	7.917	.354	31.270	.....	32.334	8	*....	....
9	9.625	8.941	.342	33.907	34.612	34.711	8	**3.47**	....
10	10.750	10.192	.279	31.201	32.515	32.631	8	**3.25**	....
10	10.750	10.136	.307	34.240	35.504	35.628	8	**3.55**	....
10	10.750	10.020	.365	40.483	41.644	41.785	8	**4.17**	....
11	11.750	11.000	.375	45.557	46.805	46.953	8	**4.68**	....
12	12.750	12.090	.330	43.773	45.217	45.358	8	**4.55**	....
12	12.750	12.000	.375	49.562	50.916	51.067	8	**5.12**	....
13	14.000	13.250	.375	54.568	56.649	56.849	8	**5.68**	....
14	15.000	14.250	.375	58.573	60.802	61.005	8	**6.18**	....
15	16.000	15.250	.375	62.579	64.955	65.161	8	**6.60**	....
17OD	17.000	16.214	.393	69.704	.....	73.000	8	*....	....
18OD	18.000	17.182	.409	76.840	.....	81.000	8	*....	....
20OD	20.000	19.182	.409	85.577	.....	90.000	8	*....	....

*Not made. †An extra charge will be made for cut lengths or galvanized, or coated pipe. Furnished with threads and couplings and all random lengths, unless otherwise ordered.

LARGE O. D. PIPE

PLAIN ENDS

PRICE LIST

ADOPTED JANUARY 1, 1913

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Outside Diam. Inches	Price, per Foot — Thickness, Inches											
	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1	1 1/8
14	3.68	4.57	5.46	6.34	7.21	8.08	8.93	9.78	10.62	12.27	13.89	15.47
15	3.94	4.91	5.86	6.81	7.75	8.68	9.60	10.51	11.42	13.20	14.96	16.68
16	4.21	5.24	6.26	7.28	8.28	9.28	10.27	11.25	12.22	14.14	16.03	17.88
17	4.48	5.57	6.66	7.74	8.82	9.88	10.94	11.98	13.02	15.07	17.09	19.08
18	4.74	5.91	7.06	8.21	9.35	10.48	11.60	12.72	13.82	16.01	18.16	20.28
20	....	6.58	7.86	9.15	10.42	11.68	12.94	14.19	15.42	17.88	20.30	22.68
21	....	6.91	8.27	9.61	10.95	12.28	13.61	14.92	16.23	.....	.....	.....
22	....	7.24	8.67	10.08	11.49	12.88	14.27	15.65	17.03	.....	.....	.....
24	....	....	9.47	11.01	12.55	14.09	15.61	17.12	18.63	.....	.....	.....
26	....	....	10.27	11.95	13.62	15.29	16.94	18.59	20.23	.....	.....	.....
28	....	....	.....	12.88	14.69	16.49	18.28	20.06	21.83	.....	.....	.....
30	....	....	.....	13.82	15.76	17.69	19.61	21.53	23.43	.....	.....	.....

ESTIMATED WEIGHTS

Outside Diam. Inches	Weight, Pounds, per Foot — Thickness, Inches					
	1/4	5/16	3/8	7/16	1/2	9/16
14	36.713	45.682	54.568	63.371	72.091	80.726
15	39.383	49.020	58.573	68.044	77.431	86.734
16	42.053	52.357	62.579	72.716	82.771	92.742
17	44.723	55.695	66.584	77.389	88.111	98.749
18	47.393	59.032	70.589	82.061	93.451	104.757
20	.....	65.708	78.599	91.407	104.131	116.772
21	.....	69.045	82.604	96.079	109.471	122.780
22	.....	72.383	86.609	100.752	114.811	128.787
24	.....	.....	94.619	110.097	125.491	140.802
26	.....	.....	102.629	119.442	136.172	152.818
28	.....	.....	.....	128.787	146.852	164.833
30	.....	.....	.....	138.132	157.532	176.848

Outside Diam. Inches	Weight, Pounds, per Foot — Thickness, Inches					
	5/8	11/16	3/4	7/8	1	1 1/8
14	89.279	97.748	106.134	122.654	138.842	154.695
15	95.954	105.091	114.144	132.	149.522	166.710
16	102.629	112.433	122.154	141.345	160.202	178.725
17	109.304	119.776	130.164	150.690	170.882	190.740
18	115.979	127.188	138.174	160.035	181.562	202.756
20	129.330	141.804	154.194	178.725	202.923	226.786
21	136.005	149.146	162.204	.....	.....	.....
22	142.680	156.489	170.215	.....	.....	.....
24	156.030	171.174	186.235	.....	.....	.....
26	169.380	185.859	202.255	.....	.....	.....
28	182.730	200.545	218.275	.....	.....	.....
30	196.081	215.230	234.296	.....	.....	.....

The permissible variation in weight is 5 per cent above and 5 per cent below.

This pipe will be shipped in random lengths, plain ends, unless otherwise ordered. For cut lengths an extra charge above random will be made. For threaded pipe an extra charge above plain end will be made.

STANDARD LAP WELDED BOILER TUBES

ADOPTED BY THE BOILER TUBE MANUFACTURERS, FEBRUARY 1, 1916

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

External Diam. Inches	Standard Thickness Minimum Birmingham Wire Gauge	Standard Thickness Inches	Weight per Foot Pounds Exact Theoretical	Weight per Foot Pounds Approx. Mfg.	Price, per Foot Standard Thickness	One Extra Wire Gauge	Two Extra Wire Gauges	Three Extra Wire Gauges	Four Extra Wire Gauges
1¾	13	.095	1.679	1.84	.22	.26	.28	.31	.34
2	13	.095	1.932	2.10	.21	.24	.26	.28	.31
2¼	13	.095	2.186	2.38	.24	.27	.29	.32	.35
2½	12	.109	2.783	3.00	.30	.33	.36	.39	.43
2¾	12	.109	3.074	3.37	.34	.37	.40	.44	.48
3	12	.109	3.365	3.74	.38	.41	.45	.49	.54
3¼	11	.120	4.011	4.45	.45	.49	.53	.59	.63
3½	11	.120	4.331	4.81	.48	.53	.58	.64	.69
3¾	11	.120	4.652	5.17	.52	.57	.62	.68	.74
4	10	.134	5.532	6.08	.61	.66	.73	.79	.88
4½	10	.134	6.248	6.87	.69	.75	.83	.89	.99
5	9	.148	7.660	8.12	.81	.90	.97	1.08	1.17
6	8	.165	10.282	10.8	1.08	1.17	1.31	1.41	1.52
7	8	.165	12.044	12.6	1.27	1.38	1.54	1.66	1.78
8	8	.165	13.807	14.5	1.45	1.58	1.76	1.90	2.05
9	7	.180	16.955	17.7	1.78	1.99	2.15	2.31	2.50
10	6	.203	21.240	22.1	2.22	2.39	2.57	2.79	3.04
11	5	.220	25.329	26.3	2.63	2.84	3.07	3.35	3.53
12	..	.229	28.788	29.8	2.99	3.23	3.51	3.76	4.10
13	4	.238	32.439	33.6	3.36	3.64	3.98	4.19	4.72

Boiler tubes to special specifications, special prices upon application.

Tubes more than four gauges heavier than standard will be charged per pound

WEIGHTS OF EXTRA GAUGE BOILER TUBES

External Diam. Inches	Nominal Weight per Foot, Pounds: One Extra Wire Gauge Exact Theoretical	One Extra Wire Gauge Approx. Mfg.	Two Extra Wire Gauges Exact Theoretical	Two Extra Wire Gauges Approx. Mfg.	Three Extra Wire Gauges Exact Theoretical	Three Extra Wire Gauges Approx. Mfg.	Four Extra Wire Gauges Exact Theoretical	Four Extra Wire Gauges Approx. Mfg.
1¾	1.910	2.07	2.089	2.24	2.312	2.46	2.532	2.68
2	2.201	2.37	2.409	2.57	2.670	2.83	2.927	3.09
2¼	2.492	2.68	2.729	2.92	3.028	3.21	3.322	3.50
2½	3.050	3.26	3.386	3.59	3.717	3.92	4.114	4.32
2¾	3.370	3.66	3.743	4.03	4.112	4.39	4.555	4.83
3	3.691	4.07	4.101	4.47	4.508	4.88	4.995	5.36
3¼	4.459	4.90	4.903	5.34	5.436	5.87	5.901	6.33
3½	4.817	5.29	5.298	5.77	5.877	6.34	6.382	6.84
3¾	5.175	5.69	5.693	6.20	6.317	6.82	6.863	7.36
4	6.088	6.64	6.758	7.30	7.343	7.88	8.232	8.76
4½	6.879	7.50	7.639	8.26	8.304	8.92	9.316	9.92
5	8.520	8.96	9.266	9.71	10.400	10.8	11.231	11.6
6	11.188	11.7	12.568	13.1	13.580	14.1	14.646	15.1
7	13.110	13.7	14.736	15.3	15.930	16.5	17.188	17.8
8	15.033	15.7	16.904	17.6	18.280	19.0	19.730	20.4
9	19.072	19.8	20.629	21.4	22.271	23.0	24.179	24.9
10	22.979	23.8	24.813	25.7	26.945	27.8	29.470	30.3
11	27.355	28.3	29.711	30.7	32.503	33.5	34.283	35.2
12	31.188	32.2	34.008	35.1	36.512	37.6	39.918	41.0
13	35.243	36.4	38.569	39.7	40.691	41.8	45.971	47.1

Under the A. S. M. E. specifications to which all these merchant boiler tubes are manufactured, the gauge ordered is the lightest weight we may ship. As it is impossible to manufacture to an exact weight, the necessary variation will be represented by overweight. Therefore the exact theoretical weight of each gauge is published, and the best estimate possible of the average shipping weight, and the list prices are predicated on this estimated weight. Tubes may be found to vary in weight from this estimate, but will not be lighter than the weight of the gauge ordered.

SEAMLESS COPPER BOILER TUBE FERRULES

PLAIN FERRULE

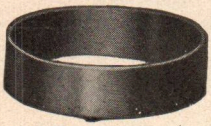


Fig. 6954A

FLANGED FERRULE

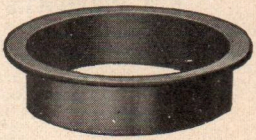


Fig. 6954B

These are high grade ferrules having no seams and made of pure sheet copper. They are made to exact sizes and annealed, being ready for use as soon as you receive them. They are a great saving to the purchaser of boilers, as it is not necessary to be continually expanding the tubes, the ferrules keeping the flues tight.

PRICE, PER HUNDRED

Adopted July 1, 1912

Diameter Inches	Width Inches	Thickness, Inches						
		1/32	3/64	1/16	5/64	3/32	7/64	1/8
1	1/2	5.10	7.50	9.50	11.75	13.50	15.50	16.50
	5/8	6.30	9.30	11.75	14.50	16.50	19.00	20.00
1 1/4	1/2	6.30	9.30	11.75	14.50	16.50	19.00	20.00
	5/8	7.80	11.60	14.50	18.25	20.50	23.50	24.75
1 1/2	1/2	7.50	11.40	14.00	17.75	19.50	23.00	24.00
	5/8	9.30	14.20	17.00	21.75	25.00	28.50	29.75
1 3/4	1/2	8.70	13.20	16.25	20.50	22.50	26.00	27.25
	5/8	10.80	16.40	20.25	25.50	28.50	33.00	34.75
	3/4	12.90	19.60	24.25	30.50	34.50	40.00	42.00
1 7/8	1/2	9.30	14.20	17.00	21.75	25.00	28.50	30.00
	5/8	11.60	17.70	21.50	27.00	31.00	35.50	37.50
	3/4	13.90	21.20	26.00	32.25	37.00	42.50	44.75
	7/8	16.20	24.70	30.50	37.50	43.00	49.50	52.25
	1	18.50	28.20	35.00	42.75	49.00	56.50	59.50
2	1/2	9.80	14.90	18.25	23.00	25.50	30.00	31.50
	5/8	12.30	18.60	23.00	28.75	32.00	37.50	39.50
	3/4	14.80	22.30	27.75	34.50	38.50	45.00	47.50
	7/8	17.30	26.00	32.50	40.25	45.00	52.50	55.25
	1	19.80	29.70	37.25	46.00	51.50	60.00	63.25
2 1/4	5/8	13.50	20.40	25.25	31.75	36.00	41.50	43.50
	3/4	16.30	24.60	30.50	38.25	43.00	50.00	52.50
	7/8	19.10	28.80	35.75	44.75	50.00	58.50	61.50
	1	21.90	33.00	41.00	51.25	57.00	67.00	70.50
2 1/2	5/8	15.00	22.80	28.25	35.75	39.50	46.50	49.00
	3/4	18.10	27.40	34.00	42.75	47.50	55.50	58.50
	7/8	21.20	32.00	39.75	49.75	55.50	64.50	68.00
	1	24.30	36.60	45.50	56.75	63.50	73.50	77.50
3	3/4	21.90	33.00	41.00	51.00	57.00	66.50	70.00
	7/8	25.50	38.40	47.75	59.50	66.50	77.50	81.50
	1	29.10	43.80	54.50	68.00	76.00	88.50	93.25
3 1/4	3/4	23.70	35.70	44.25	55.50	62.00	72.00	75.75
	7/8	27.60	41.60	51.50	64.50	72.00	84.00	88.50
	1	31.50	47.50	58.75	73.50	82.00	96.00	101.25
3 1/2	3/4	24.60	37.00	45.75	57.25	64.00	75.00	79.00
	7/8	29.30	44.00	54.50	68.25	76.00	89.00	93.75
	1	34.00	51.00	63.25	79.25	88.00	103.00	108.50
4	7/8	33.60	50.70	63.00	79.00	88.00	103.00	108.50
	1	38.40	57.90	72.00	90.25	100.00	117.00	123.25
	1 1/4	48.00	72.30	90.00	112.75	124.00	145.00	153.00

In ordering ferrules be sure to state inside diameter, outside diameter and width also thickness of copper desired and whether with or without flange.

SHELBY COLD-DRAWN SEAMLESS STEEL TUBING

ROUND

Thickness B. W. G. and Fractions	Equivalent in Decimal of Inch	Price, per Foot—Outside Diameter, Inches													
		1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4
20	.035	.09	.11	.14	.16	.18	.21	.23	....	....	....	....	....	....	....
18	.049	.12	.15	.19	.22	.25	.28	.32	.35	.38	....	....	....	....	....
16	.065	.15	.20	.24	.28	.33	.37	.41	.46	.50	.58	.67	.76	.85	....
14	.083	.19	.24	.30	.35	.42	.46	.52	.57	.63	.74	.85	.96	1.07	1.18
13	.095	.22	.27	.33	.40	.46	.52	.59	.65	.71	.84	.97	1.10	1.22	1.35
12	.109	.23	.30	.38	.45	.52	.59	.67	.74	.81	.96	1.10	1.25	1.39	1.54
11	.120	.25	.33	.41	.49	.57	.65	.73	.81	.89	1.05	1.21	1.37	1.53	1.69
10	.134	.26	.35	.44	.53	.62	.71	.80	.89	.98	1.16	1.34	1.52	1.70	1.87
5/32	.156	....	....	.50	.60	.71	.81	.91	1.02	1.12	1.33	1.54	1.75	1.96	2.16
3/16	.188	....	....	.57	.69	.82	.94	1.07	1.19	1.32	1.57	1.82	2.07	2.32	2.57
7/32	.219	....	....	....	.77	.91	1.06	1.21	1.35	1.50	1.79	2.08	2.37	2.66	2.96
1/4	.250	....	....	....	....	1.00	1.17	1.34	1.50	1.67	2.00	2.34	2.67	3.00	3.34
5/16	.313	....	....	....	....	....	....	1.57	1.77	1.98	2.40	2.82	3.23	3.65	4.07
3/8	.375	....	....	....	....	....	....	1.75	2.00	2.25	2.75	3.25	3.75	4.25	4.76
1/2	.500	....	....	....	....	....	....	....	....	2.67	3.34	4.00	4.67	5.34	6.00
5/8	.625	....	....	....	....	....	....	....	....	....	....	4.59	5.42	6.25	7.09

Thickness B. W. G. and Fractions	Equivalent in Decimal of Inch	Price, per Foot—Outside Diameter, Inches									
		3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/2
13	.095	1.48	1.60	1.73	....	....	....	....	....	....	....
12	.109	1.69	1.83	1.97	....	....	....	....	....	....	....
11	.120	1.85	2.01	2.17	2.33	2.49	....	....	....	....	....
10	.134	2.05	2.23	2.41	2.59	2.77	2.95	3.13	3.31	3.48	3.84
5/32	.156	2.37	2.58	2.79	3.00	3.21	3.41	3.62	3.83	4.04	4.46
3/16	.188	2.82	3.07	3.32	3.57	3.82	4.07	4.32	4.57	4.82	5.32
7/32	.219	3.25	3.54	3.83	4.12	4.41	4.71	5.00	5.29	5.58	6.16
1/4	.250	3.67	4.00	4.34	4.67	5.00	5.34	5.67	6.00	6.34	7.00
5/16	.313	4.48	4.90	5.32	5.73	6.15	6.57	6.98	7.40	7.82	8.65
3/8	.375	5.25	5.75	6.25	6.75	7.25	7.75	8.25	8.76	9.26	10.26
1/2	.500	6.67	7.34	8.00	8.67	9.34	10.00	10.67	11.34	12.00	13.34
5/8	.625	7.92	8.75	9.59	10.42	11.25	12.09	12.92	13.76	14.59	16.26
3/4	.750	9.00	10.00	11.00	12.01	13.00	14.01	15.01	16.01	17.01	19.01
7/8	.875	9.92	11.09	12.26	13.42	14.59	15.76	16.92	18.09	19.26	21.59
1	1.000	10.67	12.01	13.34	14.67	16.01	17.34	18.67	20.01	21.34	24.01

SQUARE AND RECTANGULAR

Thickness B. W. G. and Fractions	Equivalent in Decimal of Inch	Price, per Foot—Outside Diameter, Inches														
		1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3
20	.035	.11	.14	.17	.20	.23	.26	....	....	....	....	....	....	....	....	....
18	.049	.15	.19	.24	.28	.32	.36	....	....	....	....	....	....	....	....	....
16	.065	.19	.25	.30	.36	.42	.47	.53	.58	.64	.75	.86	....	....	....	....
14	.083	....	....	.38	.45	.52	.59	.66	.73	.80	.94	1.08	....	....	....	....
13	.095	....	....	....	.51	.59	.67	.75	.83	.91	1.07	1.23	....	....	....	....
12	.109	....	....	....	....	.66	.75	.85	.94	1.03	1.32	1.40	....	....	....	....
11	.120	....	....	....	....	.72	.82	.92	1.03	1.13	1.33	1.53	1.74	1.94	2.15	2.35
10	.134	....	....	....	....	....	....	....	....	....	1.47	1.70	1.93	2.16	2.38	2.61
5/32	.156	....	....	....	....	....	....	....	....	....	1.69	1.96	2.22	2.49	2.76	3.02
3/16	.188	....	....	....	....	....	....	....	....	....	1.99	2.31	2.63	2.95	3.27	3.58

LAP WELDED CASING

FOR WATER, WELL AND IRRIGATION PURPOSES

SCREW AND SOCKET JOINT

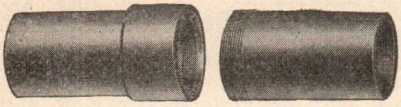


Fig. 3525A

INSERTED JOINT

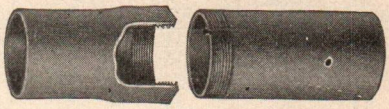


Fig. 3525B

ADOPTED JANUARY 1, 1913

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size Inches	Diameter, Inches External	Diameter, Inches Internal	Thickness Inches	Number of Threads per Inch	Weight per Foot, Pounds Threads and Couplings	Weight per Foot, Pounds Plain Ends	Price per Foot
2	2.250	2.050	.100	14	2.296	2.340	**.33**
2¼	2.500	2.284	.108	14	2.759	2.820	**.33**
2½	2.750	2.524	.113	14	3.182	3.250	**.33**
2¾	3.	2.768	.116	14	3.572	3.650	**.40**
3	3.250	3.010	.120	14	4.011	4.100	**.41**
3¼	3.500	3.250	.125	14	4.505	4.600	**.46**
3½	3.750	3.492	.129	14	4.988	5.100	**.51**
3¾	4.	3.732	.134	14	5.532	5.650	**.56½**
4	4.250	3.974	.138	14	6.060	6.200	**.62**
4¼	4.500	4.216	.142	14	6.609	6.750	**.68½**
4½	4.750	4.460	.145	14	7.131	7.250	**.74**
4¾	5.	4.696	.152	14	7.870	8.000	**.81**
5	5.250	4.944	.153	14	8.328	8.500	**.85**
5 3/16	5.500	5.192	.154	14	8.792	9.000	**.90**
5⅝	6.	5.672	.164	14	10.222	10.500	**1.05**
6¼	6.625	6.287	.169	14	11.652	12.000	**1.20**
6⅝	7.	6.652	.174	14	12.685	13.000	**1.35**
7¼	7.625	7.263	.181	14	14.390	14.750	**1.48**
7⅝	8.	7.628	.186	11½	15.522	16.000	**1.60**
8¼	8.625	8.249	.188	11½	16.940	17.500	**1.75**
8⅝	9.	8.608	.196	11½	18.429	19.000	**1.90**
9⅝	10.	9.582	.209	11½	21.855	22.750	**2.28**
10⅝	11.	10.552	.224	11½	25.780	26.750	**2.68**
11⅝	12.	11.514	.243	11½	30.512	31.500	**3.15**
12½	13.	12.482	.259	11½	35.243	36.500	**3.65**
13½	14.	13.448	.276	11½	40.454	42.000	**4.20**
14½	15.	14.418	.291	11½	45.714	47.500	**4.75**
15½	16.	15.396	.302	11½	50.632	52.500	**5.25**

The permissible variation in weight is 5 per cent above and 5 per cent below.

Screw and socket furnished with threads and couplings and in random lengths, unless otherwise ordered.

Inserted joint furnished threaded and in random lengths, unless otherwise ordered.

Thickness of walls make it impracticable to cut threads of coarser pitch than shown on table.

For cut lengths, an extra charge will be made above random.

For galvanized or coated casing, an extra charge will be made above black.

RIVETED HYDRAULIC PIPE

Fig. 24262A

Diam. In.	Gauge Steel U.S. Standard	Safe Head Feet	Weight per Foot Pounds	Price per Foot	Diam. In.	Gauge Steel U.S. Standard	Safe Head Feet	Weight per Foot Pounds	Price per Foot	Diam. In.	Gauge Steel U.S. Standard	Safe Head Feet	Weight per Foot Pounds	Price per Foot
3	18	810	2.25	.20	12	10	567	21.75	1.69	20	8	415	45.50	3.40
4	18	607	3.00	.25	13	16	233	10.50	.90	22	16	138	17.75	1.40
	16	760	3.75	.35		14	291	13.00	1.12		14	172	22.00	1.70
5	18	485	3.75	.30		12	407	18.00	1.50		12	240	30.50	2.25
	16	605	4.50	.45		11	467	20.50	1.65		11	276	34.50	2.40
	14	757	5.75	.50		10	522	23.00	1.80		10	309	39.00	2.80
6	18	405	4.25	.44	14	16	216	11.25	.98		8	376	50.00	3.75
	16	505	5.25	.50		14	271	14.00	1.17	24	14	158	23.75	1.80
	14	630	6.50	.56		12	378	19.50	1.57		12	220	32.00	2.35
7	18	346	4.75	.50		11	433	22.25	1.72		11	253	37.50	2.70
	16	433	6.00	.56		10	485	25.00	1.95		10	283	42.00	2.95
	14	540	7.50	.63	15	16	202	11.75	.96		8	346	50.00	3.50
8	16	378	7.00	.65		14	252	14.75	1.28		6	405	59.00	4.30
	14	472	8.75	.75		12	352	20.50	1.75	26	14	145	25.50	2.00
	12	660	12.00	.94		11	405	23.25	1.95		12	203	35.50	2.59
9	16	336	7.50	.69		10	453	26.00	2.10		11	233	39.50	2.87
	14	420	9.25	.88	16	16	190	13.00	1.05		10	261	44.25	3.10
	12	587	12.75	1.06		14	237	16.00	1.20		8	319	54.00	3.85
10	16	307	8.25	.72		12	332	22.25	1.70		6	373	64.00	4.75
	14	378	10.25	.82		11	379	24.50	1.85	28	14	135	27.25	2.12
	12	530	14.25	1.00		10	425	28.50	2.00		12	188	38.00	2.75
	11	607	16.25	1.25	18	16	168	14.75	1.20		11	216	42.25	3.00
	10	680	18.25	1.50		14	210	18.50	1.40		10	242	47.50	3.20
11	16	275	9.00	.75		12	295	25.25	1.90		8	295	58.00	4.15
	14	344	11.00	.94		11	337	29.00	2.10		6	346	69.00	5.00
	12	480	15.25	1.25		10	378	32.50	2.40	30	12	176	39.50	2.90
	11	553	17.50	1.44		8	400	40.00	3.00		11	202	45.00	3.15
	10	617	19.50	1.62	20	16	151	16.00	1.26		10	226	50.50	3.50
12	16	252	10.00	.82		14	189	19.75	1.54		8	276	61.75	4.30
	14	316	12.25	1.00		12	265	27.50	2.10		6	323	73.00	5.25
	12	442	17.00	1.38		11	304	31.50	2.25		4	404	90.00	6.50
	11	506	19.50	1.50		10	340	35.00	2.50		..	...	.....	....

Prices are based on double riveted pipe, coated both sides with asphaltum. Net prices vary with price of iron, so quotations must be asked for each piece of work. Size of pipe and thickness of steel depend directly upon the conditions under which pipe is to be used. Slip joints are usually used for pressures up to two hundred feet. Flanges for greater heads. Flanges add twenty to twenty-five per cent to weight given above.

AMERICAN SPIRAL RIVETED PIPE

PLAIN ENDS

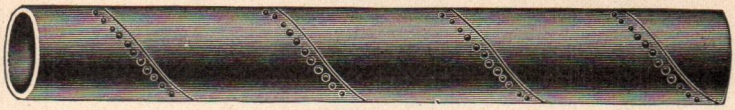


Fig. 3963A

When asking for estimates on Piping, specify quantities in feet or equivalent, diameter in inches or equivalent, purpose for which piping will be used and material to be conveyed.

Specify maximum working pressure under which piping will operate, and whether pump or gravity. On long lines where the head varies greatly, send profile or elevation, as several weights of piping may be used to advantage.

	No. 20 U. S. GAUGE			No. 18 U. S. GAUGE					
Size ..... inches	3	4	5	3	4	5	6	7	8
Price, Asphalt Coated ..... per foot	.354	.455	.554	.392	.505	.613	.723	.846	.967
" Galvanized ..... "	.474	.612	.744	.527	.680	.826	.973	1.146	1.307
Approx. Wt. per foot, Asphalted, pounds	1.9	2.4	2.9	2.3	3.0	3.7	4.3	5.1	5.8
" Bursting Strength per sq. in. ..... "	1500	1125	900	2000	1500	1200	1000	860	750

	No. 16 U. S. GAUGE										
Size ..... inches	4	5	6	7	8	9	10	11	12	13	14
Price, Asphalt Coated .. per ft.	.520	.631	.744	.870	.995	1.116	1.237	1.354	1.477	1.60	1.80
" Galvanized ..... "	.728	.882	1.040	1.216	1.395	1.564	1.731	1.897	2.067	2.25	2.52
Approx. Wt. per ft., Asphalted ..... lbs.	3.7	4.5	5.3	6.2	7.1	8.0	8.8	9.7	10.6	11.4	12.9
" Bursting Strength per sq. in .. "	1875	1500	1250	1070	935	835	750	680	625	575	535

	No. 14 U. S. GAUGE										
Size ..... inches	6	7	8	9	10	12	14	15	16	18	20
Price, Asphalt Coated, per ft.	.867	1.012	1.161	1.300	1.445	1.719	2.00	2.17	2.36	2.63	2.92
" Galvanized ..... "	1.207	1.410	1.620	1.812	2.013	2.395	2.91	3.12	3.33	3.66	4.06
Approx. Wt. per ft., Asphalted ..... lbs.	6.6	7.7	8.8	9.9	11.0	13.0	15.9	17.0	18.1	19.9	22.1
" Bursting Strength per sq. in ... "	1560	1340	1170	1045	935	780	670	625	585	520	470

	No. 12 U. S. GAUGE										
Size ..... inches	6	7	8	9	10	12	14	15	16	18	20
Price, Asphalt Coated, per ft.	1.150	1.340	1.542	1.743	1.914	2.270	2.77	2.97	3.15	3.40	3.82
" Galvanized ..... "	1.614	1.880	2.166	2.447	2.688	3.188	3.89	4.16	4.43	4.84	5.37
Approx. Wt. per ft., Asphalted ..... lbs.	9.2	10.7	12.3	13.9	15.3	18.2	22.2	23.7	25.2	27.6	30.6
" Bursting Strength per sq. in .. "	2170	1860	1640	1460	1310	1080	940	875	820	730	660

	No. 10 U. S. GAUGE					No. 8 U. S. GAUGE				
Size ..... inches	12	13	14	15	16	18	20	16	18	20
Price, Asphalt Coated .... per foot	2.755	2.99	3.38	3.62	3.85	4.22	4.68	4.66	5.09	5.65
" Galvanized ..... "	3.881	4.22	4.75	5.10	5.42	5.95	6.59	6.54	7.16	7.94
Approx. Wt. per ft., Asphalted, lbs.	22.5	24.5	27.6	29.6	31.5	34.5	38.3	38.1	41.6	46.2
" Bursting Strength per sq. in ... "	1410	1295	1210	1125	1050	940	840	1290	1140	1030

	No. 6 U. S. GAUGE					No. 3 U. S. GAUGE				
Size ..... inches	16	18	20	22	24	16	18	20	22	24
Price, Asphalt Coated .... per foot	5.47	6.00	6.62	7.28	7.90	6.31	7.25	8.02	8.83	9.60
" Galvanized ..... "	7.67	8.41	9.28	10.21	11.09	8.84	10.14	11.23	12.36	13.43
Approx. Wt. per ft., Asphalted, lbs.	44.7	49.0	54.1	59.5	64.6	51.6	59.2	65.6	72.2	78.4
" Bursting Strength per sq. in ... "	1520	1360	1220	1108	1015	1880	1660	1500	1364	1250

FLANGES FOR AMERICAN SPIRAL RIVETED PIPE

FORGED STEEL SPIRAL PIPE STANDARD DIAMETER AND DRILLING

Size Inches	Outside Diameter Inches	Thickness of Flange Inches	Price, Each, with Bolt Holes — Black: Flange not Attached	Black: Flange Attached to Pipe	Galvanized: Flange not Attached	Galvanized: Flange Attached to Pipe	Dimensions of Drilling: Number of Bolts	Size of Bolts Inches	Diam. of Bolt Circle Inches
3	6	5/16	.90	1.75	1.10	1.90	4	7/16	4 3/4
4	7	5/16	1.05	2.05	1.30	2.30	8	7/16	5 15/16
5	8	5/16	1.35	2.40	1.60	2.70	8	7/16	6 15/16
6	9	3/8	1.60	2.75	2.00	3.15	8	1/2	7 7/8
7	10	3/8	1.70	2.95	2.15	3.40	8	1/2	9
8	11	3/8	2.15	3.45	2.80	4.05	8	1/2	10
9	13	3/8	2.65	4.10	3.50	4.90	8	1/2	11 1/4
10	14	3/8	2.95	4.50	3.95	5.45	8	1/2	12 1/4
11	15	7/16	3.10	4.65	4.15	5.65	12	1/2	13 3/8
12	16	7/16	3.25	4.75	4.35	5.85	12	1/2	14 1/4
13	17	7/16	3.60	5.15	4.85	6.25	12	1/2	15 1/4
14	18	7/16	3.80	5.50	5.10	6.80	12	1/2	16 1/4
15	19	9/16	4.75	7.75	6.35	9.35	12	1/2	17 7/16
16	21 1/4	5/8	6.50	8.60	9.00	11.00	12	1/2	19 1/4
18	23 1/4	5/8	7.90	10.30	11.00	13.35	16	5/8	21 1/4
20	25 1/4	5/8	9.30	12.50	12.75	15.85	16	5/8	23 1/8
22	28 1/4	11/16	11.60	15.95	15.90	20.25	16	5/8	26
24	30	11/16	13.00	18.00	17.70	22.70	16	5/8	27 3/4
26	32	Dependent on service required	13.50	18.25	18.95	23.70	24	3/4	29 3/4
28	34		14.25	19.50	20.15	25.40	28	3/4	31 3/4
30	36		15.25	21.25	21.60	27.60	28	3/4	33 3/4
32	38		16.00	22.75	22.75	29.50	28	3/4	35 3/4
34	40		17.00	24.50	24.25	31.75	28	3/4	37 3/4
36	42		18.50	26.00	26.10	33.60	32	3/4	39 3/4
40	46		20.00	28.75	28.50	37.25	32	3/4	43 3/4

FORGED STEEL A. S. M. E. STANDARD DIAMETER AND DRILLING

*3	7 1/2	....	1.60	2.60	2.45	3.40	4	5/8	6
4	9	9/16	2.00	3.60	2.80	4.40	4	3/4	7 1/2
5	10	9/16	2.15	4.30	3.10	5.20	8	3/4	8 1/2
6	11	9/16	2.85	4.80	3.90	5.85	8	3/4	9 1/2
7	12 1/2	9/16	3.35	5.70	5.00	6.95	8	3/4	10 3/4
8	13 1/2	5/8	4.15	6.35	5.80	8.00	8	3/4	11 3/4
9	15	5/8	4.85	7.20	7.00	9.20	12	3/4	13 1/4
10	16	11/16	5.85	7.90	8.00	10.00	12	7/8	14 1/4
12	19	3/4	9.25	11.30	12.75	14.80	12	7/8	17
14	21	3/4	10.45	12.90	14.50	16.75	12	1	18 3/4
15	22 1/4	3/4	12.00	16.90	16.80	21.70	16	1	20
16	23 1/2	3/4	12.30	17.20	17.10	22.00	16	1	21 1/4
18	25	3/4	15.75	19.75	23.25	27.25	16	1 1/8	22 3/4
20	27 1/2	7/8	18.50	23.50	28.00	33.00	20	1 1/8	25
22	29 1/2	7/8	21.75	26.75	32.50	37.50	20	1 1/4	27 1/4
24	32	7/8	23.50	30.25	36.00	42.90	20	1 1/4	29 1/2
26	34 1/4	1	37.50	45.90	52.90	61.25	24	1 1/4	31 3/4
28	36 1/2	1	40.00	49.50	57.25	66.50	28	1 1/4	34
30	38 3/4	1	42.00	52.25	60.50	70.75	28	1 3/8	36
36	45 3/4	1 1/8	62.50	78.50	90.50	106.75	32	1 3/8	42 3/4
40	50	1 1/8	74.50	94.50	109.00	128.50	36	1 1/2	47 1/4
42	52 3/4	1 1/8	80.00	102.00	115.00	137.00	36	1 1/2	49 1/2

*Made in cast iron only.

Threaded companion flanges furnished to match the above standard.

BOLTS AND GASKETS

FOR FLANGE CONNECTIONS

SPIRAL PIPE STANDARD

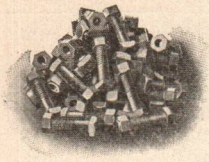


Fig. 23638A

A. S. M. E. STANDARD

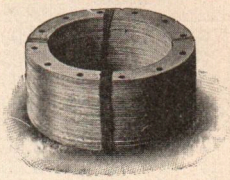


Fig. 23638B

SPIRAL PIPE STANDARD

Size Inches	Price, Bolts, per Set Black	Galv.	Price Gaskets Each	Size Inches	Price, Bolts, per Set Black	Galv.	Price Gaskets Each
3	.17	.23	.17	16	.70	.95	1.70
4	.35	.45	.20	18	1.30	1.95	2.10
5	.35	.45	.25	20	1.30	1.95	2.40
6	.45	.60	.30	22	1.30	1.95	3.35
7	.45	.60	.35	24	1.30	1.95	3.80
8	.45	.60	.45	26	2.70	4.25	5.25
9	.45	.60	.60	28	3.15	4.90	6.20
10	.45	.60	.80	30	3.15	4.90	7.20
11	.65	.90	.90	32	3.15	4.90	8.20
12	.65	.90	1.00	34	3.15	4.90	9.00
13	.65	.90	1.10	36	3.60	5.70	9.55
14	.65	.90	1.20	40	3.80	6.10	11.00
15	.70	.95	1.45	..	....	....	.....

A. S. M. E. STANDARD

Size Inches	Price, Bolts, per Set Black	Galv.	Price Gaskets Each	Size Inches	Price, Bolts, per Set Black	Galv.	Price Gaskets Each
3	.30	.50	.35	16	4.35	7.20	2.90
4	.50	.80	.40	18	6.30	10.50	3.45
5	.95	1.55	.45	20	8.30	13.80	4.00
6	1.00	1.65	.65	22	11.30	18.70	4.50
7	1.00	1.65	.70	24	11.30	18.70	4.90
8	1.00	1.65	.90	26	14.25	23.40	5.25
9	1.50	2.40	1.15	28	16.50	27.50	6.20
10	2.30	3.80	1.25	30	19.00	31.50	7.20
12	2.30	3.80	1.60	36	22.50	37.50	9.55
14	3.25	5.40	2.00	40	34.00	56.00	11.00

CAST IRON PIPE

STANDARD PIPE

Fig. 3692A

STANDARD THICKNESS AND WEIGHTS OF CAST IRON PIPE BELL AND SPIGOT PIPE. TURNED AND BORED PIPE

All lengths to lay 12 feet. All weights are approximate; those per foot include allowance for bell. All pipe is tested by water pressure. Turned and bored pipe made to order only.

Nominal Inside Diameter Inches	Class A Gas 100-foot Head 43 Pounds Pressure		Class B Standard 200-foot Head 86 Pounds Pressure		Class C Medium Heavy 300-foot Head 130 Pounds Pressure		Class D Extra Heavy 400-foot Head 173 Pounds Pressure	
	Thickness Inches	Weight per Foot Pounds	Thickness Inches	Weight per Foot Pounds	Thickness Inches	Weight per Foot Pounds	Thickness Inches	Weight per Foot Pounds
3	....	.....	.50	18.	.53	19.	....	.....
4	.42	20.	.45	21.7	.48	23.3	.52	25.
6	.44	30.8	.48	33.3	.51	35.8	.55	38.3
8	.46	42.9	.51	47.5	.56	52.1	.60	55.8
10	.50	57.1	.57	63.8	.62	70.8	.68	76.7
12	.54	72.5	.62	82.1	.68	91.7	.75	100.
14	.57	89.6	.66	102.5	.74	116.7	.82	129.2
16	.60	108.3	.70	125.	.80	143.8	.89	158.3
18	.64	129.2	.75	150.	.87	175.	.96	191.7
20	.67	150.	.80	175.	.92	208.3	1.03	229.2
24	.76	204.2	.89	233.3	1.04	279.2	1.16	306.7
30	.88	291.7	1.03	333.3	1.20	400.	1.37	450.
36	.99	391.7	1.15	454.2	1.36	545.8	1.58	625.
42	1.10	512.5	1.28	591.7	1.54	716.7	1.78	825.
48	1.26	666.7	1.42	750.	1.71	908.3	1.96	1050.
54	1.35	800.	1.55	933.3	1.90	1141.7	2.23	1341.7
60	1.39	916.7	1.67	1104.2	2.	1341.7	2.38	1583.3
72	1.62	1283.4	1.95	1545.8	2.39	1904.2	....	.....
84	1.72	1633.4	2.22	2104.2	....	.....	....	.....

FLANGED WATER PIPE

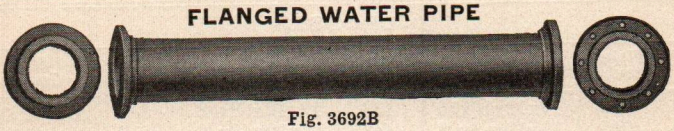


Fig. 3692B

Flanged Cast Iron Pipe, sizes 3 to 48 inches, same thickness as Standard Pipe. Thickness of flange equals approximately 1½ times thickness of pipe, plus ⅛ inch. Pipe made in 12-foot lengths and faced $\frac{1}{16}$ inch short for gaskets.

APPROXIMATE WEIGHTS OF LEAD AND HEMP REQUIRED FOR JOINTS

Pipe ..... inches	4	6	8	10	12	14	16	18	20
Lead, 2 Inches Thick ..... pounds	7.5	10.25	13.25	16	19	22	30	33.8	37
Hemp ..... "	.21	.31	.44	.53	.61	.81	.94	1	1.25
Pipe ..... inches	24	30	36	42	48	54	60	72	84
Lead, 2 Inches Thick ..... pounds	44	54.25	64.75	75.25	85.5	97.6	108.30	128	147
Hemp ..... "	1.50	2.06	3	3.62	4.37	6.25	8.25	12.5	15

Inquiries and orders should clearly indicate the approximate number of lengths or feet of pipe of each size and class required. Give the desired delivery point and time of shipment, with any particulars as to sizes required first, the service intended, etc.; this will facilitate prompt attention and avoid delays.

SPECIALS FOR CAST IRON PIPE

QUARTER BEND

Fig. 14A

EIGHTH BEND

Fig. 14B

TEE

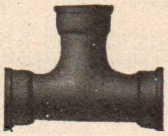


Fig. 14C

CROSS

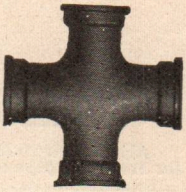


Fig. 14D

QUARTER BENDS, 90°

Size.....inches	4	6	8	10	12	14	16	18	20	24	30	36
Weight.....pounds	82	130	200	278	366	504	750	888	1070	1656	2836	4820

EIGHTH BENDS, 45°

Size.....inches	4	6	8	10	12	14	16	18	20	24	30	36
Weight.....pounds	66	105	150	202	265	442	558	663	964	1515	2291	4012

SIXTEENTH BENDS, 22½°

Size.....inches	4	6	8	10	12	14	16	18	20	24	30	36
Weight.....pounds	66	105	150	202	265	382	484	574	858	1372	2080	4012

TEES

Size Inches	Weight Pounds	Size Inches	Weight Pounds	Size Inches	Weight Pounds	Size Inches	Weight Pounds
4x4x4	128	10x10x10	394	12x12x 8	474	20x20x20	1438
6x6x6	200	10x10x 8	371	12x12x 6	458	24x24x24	2113
6x6x4	183	10x10x 6	352	12x12x 4	445	30x30x30	3660
8x8x8	294	10x10x 4	338	14x14x14	724	36x36x36	5567
8x8x6	270	12x12x12	512	16x16x16	969	48x48x48	....
8x8x4	255	12x12x10	491	16x16x12	861	.....	....

CROSSES

Size Inches	Weight Pounds	Size Inches	Weight Pounds	Size Inches	Weight Pounds	Size Inches	Weight Pounds
4x4x4x4	166	10x10x10x10	493	12x12x 8x 8	545	20x20x20x20	1828
6x6x6x6	257	10x10x 8x 8	443	12x12x 6x 6	512	24x24x24x24	2694
6x6x4x4	221	10x10x 6x 6	406	12x12x 4x 4	486	30x30x30x30	4609
8x8x8x8	372	10x10x 4x 4	377	14x14x14x14	963	36x36x36x36	6857
8x8x6x6	325	12x12x12x12	623	16x16x16x16	1259	48x48x48x48	....
8x8x4x4	294	12x12x10x10	577	18x18x18x18	1454	.....	....

SLEEVE

Fig. 14E

PLUG

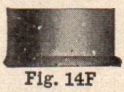


Fig. 14F

CAP

Fig. 14G

Size.....inches	4	6	8	10	12	14	16	18	20	24	30	36	48
Weight, Sleeves.....pounds	61	87	119	176	223	280	443	518	625	821	1262	1772	2879
" Plugs..... "	8	14	24	38	50	65	96	121	156	472	723	1050	2047
" Caps..... "	26	40	59	81	104	149	198	242	308	442	704	1084	2341

SPECIALS FOR CAST IRON PIPE

Y BRANCH

Fig. 8948A

REDUCER

Fig. 8948B

INCREASER

Fig. 8948C

Y Branches		Reducers						Increasers	
Size Inches	Weight Pounds	Size Inches	Weight Pounds	Size Inches	Weight Pounds	Size Inches	Weight Pounds	Size Inches	Weight Pounds
4 x 4	103	6 x 4	97	14 x 10	320	20 x 16	711	4 x 6	104
6 x 6	181	8 x 6	143	14 x 8	288	20 x 14	638	4 x 8	132
8 x 8	291	8 x 4	119	14 x 6	256	20 x 12	576	4 x 10	162
10 x 10	434	10 x 8	198	16 x 14	461	24 x 20	987	6 x 8	150
12 x 12	632	10 x 6	169	16 x 12	405	24 x 18	901	6 x 10	180
14 x 14	985	10 x 4	146	16 x 10	364	24 x 16	838	6 x 12	218
16 x 16	1413	12 x 10	261	18 x 16	569	24 x 14	764	8 x 10	201
18 x 18	1737	12 x 8	231	18 x 14	502	30 x 24	1398	8 x 12	240
20 x 20	2199	12 x 6	202	18 x 12	446	36 x 30	2264	10 x 12	267
24 x 24	3599	12 x 4	179	18 x 10	405	.....	....	12 x 14	378
.....	....	14 x 12	360	20 x 18	776	.....	....	.....	....

SPLIT TEE

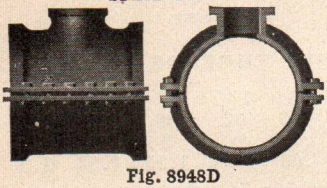


Fig. 8948D

SPLIT SLEEVE

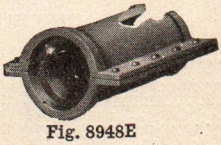


Fig. 8948E

SPLIT TEES, WITH ANY SIZE OUTLET

Size...inches	3	4	6	8	10	12	14	16	18	20	24	30	36
Price ...each	6.50	8.00	10.00	12.50	17.50	20.00	22.50	27.50	35.00	40.00	50.00	60.00	70.00

SPLIT SLEEVES

Size ...inches	3	4	6	8	10	12	14	16	18	20	24	30	36
Price....each	3.00	3.00	5.25	8.25	11.50	13.50	20.00	21.00	28.50	38.50	40.00	45.00	55.00

FLANGE AND SPIGOT

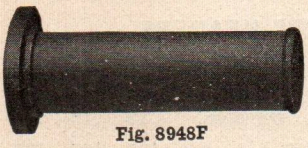


Fig. 8948F

FLANGE AND BELL

Fig. 8948G

FLANGE

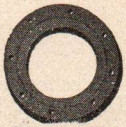


Fig. 8948H

Size .....inches	3	4	6	8	10	12	14	16	18	20	24
Length, Flange and Spigot....inches	16	16	16	16	18	18	18	20	20	20	24
Laying Length, Flange and Bell "	4	4	4	4	6	6	6	6	6	6	6
Price, Flange and Spigot .....each	1.90	2.50	3.75	5.95	9.00	11.85	14.70	20.00	22.80	27.50	43.00
" Flange and Bell.. "	2.20	2.80	4.05	6.00	8.75	11.25	14.40	18.00	19.70	23.90	40.00
" Flange, Faced and Drilled "	2.25	3.00	4.00	6.50	9.25	12.50	16.00	26.00	31.00	34.00	46.00

PIPE CUTTING AND THREADING

DIAGRAM SHOWING SCREWED VALVES AND FITTINGS

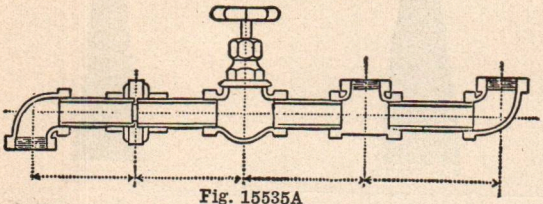


Fig. 15535A

We are in a position to furnish quickly pipe cutting, threading and fitting all sizes of pipe to order.

In laying out work of this kind, great care should be taken in making sketches.

All measurements should be given center to center as shown in diagrams. It is also necessary to know for what purpose the pipe is to be used and pressure required to stand. Too much care cannot be exercised in making these diagrams.

Give all measurements from center to center. It is advisable, though not necessary to state the purpose for which the pipe is to be used and the pressure it must withstand.

If flanged fittings are to be used, state if desired drilled, and if with bolts and gaskets complete. Flanges, flanged fittings and valves are drilled in multiples of four, so that they may be made to place in any quarter, and bolts straddle the center line. It is always most advisable to send templates when drilling of valves or fittings is required.

DIAGRAM SHOWING FLANGED VALVES AND FITTINGS

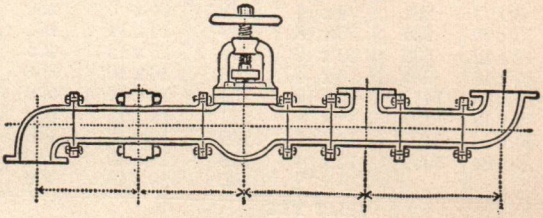


Fig. 15535B

CUTTING STANDARD PIPE THREADS

Size.....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price.....each	.05	.05	.05	.05	.05	.06	.07	.08	.10	.15	.20
Size.....inches	3½	4	4½	5	6	7	8	9	10	12	....
Price.....each	.25	.35	.45	.55	.70	.85	1.00	1.25	1.50	2.50	....

Above price includes cut and thread. Cutting pipe only, no threads, one-half above list.

For cutting extra strong pipe, double above list. For cutting double extra strong pipe, triple above list. For threading only, extra strong pipe and double extra strong pipe, same list as for standard pipe.

LOCKNUT THREADS

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Price.....each	.10	.10	.10	.10	.12	.14	.16	.20	.30	.40	.50	.70

DRILLING AND TAPPING PIPE HEADERS

MADE FROM EITHER 3 OR 4 INCH PIPE

Size of Holes for Iron Pipe.....inches	½	¾	1	1¼
Price, Drilled and Tapped in Standard Pipe.....per hole	.15	.15	.20	.25
" " " " " Extra Heavy Pipe..... "	.18	.18	.25	.30

DRILLING AND TAPPING PIPE HEADERS

MADE FROM EITHER 5 OR 6 INCH PIPE

Size of Holes for Iron Pipe.....inches	½	¾	1	1¼	1½	2
Price, Drilled and Tapped in Standard Pipe .per hole	.18	.18	.25	.30	.40	.45
" " " " " Extra Heavy Pipe "	.20	.20	.30	.35	.45	.50

PIPE BENDS

MADE FROM LAP WELDED PIPE

We are in a position to furnish bent and finished flanged pipe in all sizes, and can furnish bends in full weight, extra strong or double extra strong wrought pipe, equipped with screwed, Van Stone or steel weld flanges in standard, extra heavy or hydraulic dimensions. These flanges can be made of cast iron, ferrosteel, malleable iron, cast steel or forged steel.

Where bends are used to take care of expansion and contraction movements, the flanges should be extra heavy cast steel or forged steel or malleable iron to provide sufficient strength for the strains.

The thickness of the wall of the pipe in a bend should be determined by the pressure under which the bend is to be operated and the diameter of the pipe. We will be pleased to give our recommendations for any particular service. The thicknesses given in the table below are the lightest we recommend and carry a sufficient safety factor, taking into consideration the scaling of pipe in the bending fire and thinning of wall due to stretching during the bending process.

THICKNESS OF PIPE FOR VARIOUS BENDS

UP TO 125 POUNDS WORKING PRESSURE

Radius	Pipe Size	Pipe
4 to 5 Diameters	7 Inches and Smaller	Extra Strong
	8 " " Larger	½ Inch Thick
Over 5 Diameters	7 " " Smaller	Full Weight
	8 "	28.55 Pounds per Foot
	10 "	40.48 " " "
	12 "	49.56 " " "
	14 " to 16 Inches, Inclusive	5/16 Inch Thick
	18 " " 22 " "	3/8 " "
	24 " " 30 " "	7/16 " "

125 POUNDS TO 250 POUNDS WORKING PRESSURE

4 to 5 and 6 Diameters	7 Inches and Smaller	Extra Strong
	8 " " Larger	½ Inch Thick
Over 6 Diameters	7 " " Smaller	Full Weight
	8 "	28.55 Pounds per Foot
	10 "	40.48 " " "
	12 "	49.56 " " "
	14 " to 16 Inches, Inclusive	3/8 Inch Thick
	18 " " 22 " "	7/16 " "
	24 " " 30 " "	½ " "

250 POUNDS TO 350 POUNDS WORKING PRESSURE

4 Diameters and Over	7 Inches and Smaller	Extra Strong
	8 " " Larger	½ Inch Thick

By use of special machinery for threading and flanging, we are enabled to furnish work that is absolutely correct. These bends are exact to the number of degrees ordered, and the flanges are made on at 90 degrees to the axis of the pipe in the tangent, so that it is not necessary to force the bend into place and bolt it up in the line under an angular strain.

Every bend is carefully tested under hydraulic pressure before shipment. In the table above we give the shortest recommended radii and tangents for different sizes of full weight and extra strong pipe; but wherever possible, these radii should be increased to allowable limits, as a short radius bend is not as flexible as one built with a longer radius. In addition it is more difficult to avoid buckles where the pipe is bent to a short radius. Five to six diameters of the pipe make a safe radius.

SPECIFICATIONS FOR BENDS

A request for an estimate, or an order for bends should be accompanied by a sketch or blue print showing all the necessary dimensions. In addition we should be furnished with information relative to the thickness of pipe desired in the bend and the type of flanges to be furnished.

WROUGHT COUPLINGS

STANDARD

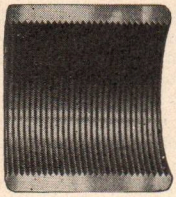


Fig. 639A

EXTRA HEAVY

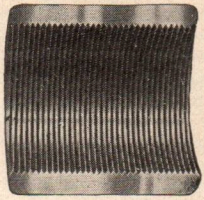


Fig. 639B

STANDARD

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Black.....each	.05	.05	.06	.07	.10	.13	.17	.21	.28
" Galvanized ... "	.06	.06	.08	.10	.13	.18	.25	.32	.40
Size.....inches	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8
Price, Black.....each	.40	.60	.80	1.00	1.50	1.65	2.40	3.25	4.25
" Galvanized ... "	.55	.80	1.05	1.40	2.00	2.25	3.25	4.20	5.50
Size.....inches	9	10	11	12	13	14	15	....	....
Price, Black.....each	5.50	7.50	10.00	10.00	12.50	18.75	25.00	....	....
" Galvanized ... "	7.00	9.75	12.85	13.65	16.50	23.85	30.25	....	....

EXTRA HEAVY

Size .....inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Black .....each	.14	.20	.26	.34	.42	.56	.80	1.20
" Galvanized ..... "	.20	.25	.32	.42	.55	.75	1.05	1.50

LINE, TUBING AND DRIVE COUPLINGS

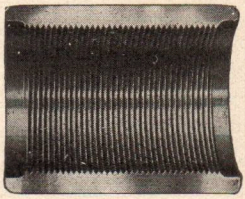


Fig. 639C

Size .....inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Black .....each	.10	.10	.10	.12	.15	.25	.30	.40
" Galvanized ..... "	.14	.14	.14	.16	.21	.37	.46	.57
Size .....inches	2 1/2	3	3 1/2	4	4 1/2	5	6	7
Price, Black .....each	.60	.80	1.30	1.50	2.00	2.40	2.80	3.85
" Galvanized ..... "	.85	1.15	1.90	2.15	2.85	3.45	4.00	5.55
Size .....inches	8	9	10	11	12	13	14	15
Price, Black .....each	4.00	5.00	6.00	8.00	8.00	10.00	13.00	20.00
" Galvanized ..... "	5.80	7.25	8.75	10.75	11.15	13.75	17.75	25.00

NIPPLES

CLOSE NIPPLE

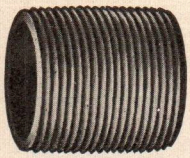


Fig. 45A

SHOULDER NIPPLE

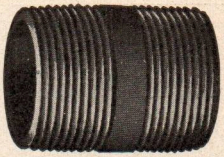


Fig. 45B

BLACK RIGHT-HAND NIPPLES

Length, Inches						Size, Inches	Price, Each		Price, Extra Long Nipples, Each								
									Length, Inches								
Close	Short	Long					Close or Short	Long	4	5	6	7	8	9	10	11	12
¾	1½	2	2½	3	3½	⅛	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
⅞	1½	2	2½	3	3½	¼	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
1	1½	2	2½	3	3½	⅜	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
1⅛	1½	2	2½	3	3½	½	.05	.07	.08	.10	.12	.14	.16	.18	.20	.22	.23
1⅜	2	2½	3	3½	4	¾	.06	.09	....	.11	.13	.17	.18	.20	.22	.24	.26
1½	2	2½	3	3½	4	1	.08	.13	....	.15	.18	.23	.25	.28	.31	.34	.36
1⅝	2½	3	3½	4	4½	1¼	.11	.17	....	.20	.24	.29	.33	.36	.40	.44	.47
1¾	2½	3	3½	4	4½	1½	.13	.20	....	.25	.29	.36	.40	.45	.50	.54	.59
2	2½	3	3½	4	4½	2	.18	.27	....	.32	.38	.50	.54	.59	.65	.72	.77
2½	3	3½	4	4½	5	2½	.39	.59	....	....	.68	.90	.97	1.06	1.17	1.26	1.35
2⅝	3	3½	4	4½	5	3	.48	.72	....	....	.85	1.08	1.20	1.33	1.45	1.58	1.70
2¾	4	4½	5	5½	6	3½	.75	1.05	....	....	....	1.30	1.45	1.60	1.75	1.90	2.05
2⅞	4	4½	5	5½	6	4	.85	1.20	....	....	....	1.52	1.69	1.87	2.05	2.22	2.40
2⅞	4	4½	5	5½	6	4½	1.25	1.70	....	....	....	2.25	2.50	2.75	2.95	3.17	3.40
3	4½	5	5½	6	6½	5	1.55	2.45	....	....	....	2.58	2.83	3.10	3.35	3.60	3.85
3⅛	4½	5	5½	6	6½	6	1.85	2.90	....	....	....	3.05	3.35	3.70	4.00	4.30	4.65
3¼	5	...	...	...	...	7	3.20	....	....	....	3.60	4.05	4.45	4.90	5.30	5.75	6.15
3½	5	...	...	...	...	8	3.55	....	....	....	4.05	4.55	5.05	5.50	6.00	6.50	7.00
3⅝	5	...	...	...	...	9	5.25	....	....	....	....	....	6.50	7.10	7.75	8.40	9.00
3⅞	5	...	...	...	...	10	6.75	....	....	....	....	....	8.25	8.90	9.70	10.40	11.15
4½	5	...	...	...	...	12	8.00	....	....	....	....	....	10.00	10.80	11.75	12.70	13.65

Nipples made to order from extra heavy pipe at double above list. Nipples larger than 12 inches made to order and charged as cut pipe. Threads extra.

NIPPLES

BLACK RIGHT AND LEFT-HAND NIPPLES

Length, Inches						Size, Inches	Price, Ea.		Price, Extra Long Nipples, Each — Length, Inches								
Close	Short	Long					Close or Short	Long	4	5	6	7	8	9	10	11	12
3/4	1 1/2	2	2 1/2	3	3 1/2	1/8	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
7/8	1 1/2	2	2 1/2	3	3 1/2	1/4	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
1	1 1/2	2	2 1/2	3	3 1/2	3/8	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
1 1/8	1 1/2	2	2 1/2	3	3 1/2	1/2	.07	.10	.11	.13	.16	.18	.21	.24	.27	.29	.31
1 3/8	2	2 1/2	3	3 1/2	4	3/4	.08	.12	....	.15	.17	.23	.25	.27	.29	.32	.35
1 1/2	2	2 1/2	3	3 1/2	4	1	.11	.18	....	.20	.24	.31	.33	.37	.41	.45	.48
1 5/8	2 1/2	3	3 1/2	4	4 1/2	1 1/4	.15	.23	....	.27	.32	.39	.45	.50	.55	.60	.65
1 3/4	2 1/2	3	3 1/2	4	4 1/2	1 1/2	.18	.27	....	.34	.39	.48	.52	.60	.67	.72	.80
2	2 1/2	3	3 1/2	4	4 1/2	2	.24	.36	....	.43	.51	.67	.72	.80	.87	.96	1.03
2 1/2	3	3 1/2	4	4 1/2	5	2 1/2	.52	.79	....	....	.91	1.20	1.30	1.40	1.55	1.68	1.80
2 5/8	3	3 1/2	4	4 1/2	5	3	.65	.96	....	....	1.13	1.44	1.60	1.77	1.93	2.10	2.27
2 3/4	4	4 1/2	5	5 1/2	6	3 1/2	1.00	1.40	....	....	....	1.75	1.95	2.15	2.35	2.55	2.75
2 7/8	4	4 1/2	5	5 1/2	6	4	1.15	1.60	....	....	....	2.00	2.25	2.50	2.75	3.00	3.25

Add 60 per cent to above prices for galvanized right and left nipples.

GALVANIZED RIGHT-HAND NIPPLES

Length, Inches						Size, Inches	Price, Ea.		Price, Extra Long Nipples, Each — Length, Inches								
Close	Short	Long					Close or Short	Long	4	5	6	7	8	9	10	11	12
3/4	1 1/2	2	2 1/2	3	3 1/2	1/8	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
7/8	1 1/2	2	2 1/2	3	3 1/2	1/4	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
1	1 1/2	2	2 1/2	3	3 1/2	3/8	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
1 1/8	1 1/2	2	2 1/2	3	3 1/2	1/2	.06	.11	.13	.16	.18	.23	.26	.28	.31	.33	.36
1 3/8	2	2 1/2	3	3 1/2	4	3/4	.08	.14	....	.18	.21	.26	.29	.32	.35	.38	.41
1 1/2	2	2 1/2	3	3 1/2	4	1	.11	.19	....	.24	.28	.34	.38	.42	.47	.51	.55
1 5/8	2 1/2	3	3 1/2	4	4 1/2	1 1/4	.17	.29	....	.32	.38	.45	.51	.57	.63	.69	.75
1 3/4	2 1/2	3	3 1/2	4	4 1/2	1 1/2	.21	.35	....	.39	.46	.55	.63	.70	.77	.84	.91
2	2 1/2	3	3 1/2	4	4 1/2	2	.27	.47	....	.52	.61	.74	.83	.93	1.03	1.13	1.23
2 1/2	3	3 1/2	4	4 1/2	5	2 1/2	.56	.86	....	....	1.00	1.26	1.41	1.56	1.71	1.86	2.01
2 5/8	3	3 1/2	4	4 1/2	5	3	.70	1.10	....	....	1.30	1.60	1.80	2.00	2.20	2.40	2.60
2 3/4	4	4 1/2	5	5 1/2	6	3 1/2	1.20	1.70	....	....	....	2.10	2.35	2.60	2.85	3.15	3.40
2 7/8	4	4 1/2	5	5 1/2	6	4	1.35	1.87	....	....	....	2.30	2.60	2.90	3.20	3.50	3.80
2 7/8	4	4 1/2	5	5 1/2	6	4 1/2	1.85	2.60	....	....	....	3.30	3.65	4.05	4.45	4.85	5.25
3	4 1/2	5	5 1/2	6	6 1/2	5	2.30	3.15	....	....	....	3.75	4.20	4.60	5.00	5.40	5.85
3 1/8	4 1/2	5	5 1/2	6	6 1/2	6	2.80	4.25	....	....	....	4.50	5.00	5.55	6.05	6.60	7.15
3 1/4	5	...	...	...	...	7	4.25	....	....	....	4.95	5.65	6.35	7.05	7.75	8.45	9.20
3 1/2	5	...	...	...	...	8	5.00	....	....	....	5.80	6.65	7.50	8.35	9.25	10.10	10.95

Nipples made to order from galvanized extra heavy pipe at double above list.

STANDARD EASTERN LIST

MALLEABLE IRON FITTINGS

ELBOWS — PLAIN, 45°, STREET, DROP

TEES — PLAIN, SERVICE

Fig. 32538A

Fig. 32538B

Fig. 32538C

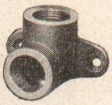


Fig. 32538D

Fig. 32538E

Fig. 32538F

ELBOWS

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Blk., Pla., Strt. . . . each	.06	.07	.08	.10	.15	.22	.25	.35	.50	.90	1.50	2.25	3.00	3.50	4.00	6.50
" " Red. . . . . "	. . .	.07	.08	.10	.15	.22	.25	.35	.50	.90	1.50	2.25	3.00	3.50	4.00	6.50
" Bd., Strt. . . . . "	. . .	.07	.08	.10	.15	.22	.25	.35	.50	.90	1.50	2.25	3.00	3.50	4.00	6.50
" " Red. . . . "	. . .	.07	.08	.10	.15	.22	.25	.35	.50	.90	1.50	2.25	3.00	3.50	4.00	6.50
" " R. & L. . "	. . .	.09	.11	.13	.17	.25	.30	.40	.65	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Galv. Pla., Strt. . . . "	.08	.09	.11	.14	.20	.32	.40	.60	.90	1.50	2.60	3.75	5.00	. . .	6.50	10.00
" " Red. . . . "	. . .	.09	.11	.14	.20	.32	.40	.60	.90	1.50	2.60	3.75	5.00	. . .	6.50	10.00
" Bd., Strt. . . . "	. . .	.09	.11	.14	.20	.32	.40	.60	.90	1.50	2.60	3.75	5.00	. . .	6.50	10.00
" " Red. . . . "	. . .	.09	.11	.14	.20	.32	.40	.60	.90	1.50	2.60	3.75	5.00	. . .	6.50	10.00
" " S. & L. . "	. . .	.12	.16	.17	.23	.35	.45	.65	1.00	. . .	. . .	. . .	. . .	. . .	. . .	. . .
45°, Blk., Pla. . . . "	. . .	.08	.10	.12	.18	.26	.36	.54	.82	1.25	2.50	3.25	4.50	5.25	6.00	7.50
45°, " Bd. . . . "	. . .	.08	.10	.12	.18	.26	.36	.54	.82	1.25	2.50	3.25	4.50	5.25	6.00	7.50
45°, Galv., Pla. . . . "	. . .	.12	.15	.20	.25	.40	.50	.85	1.35	1.90	3.75	4.75	6.75	. . .	9.00	11.00
45°, " Bd. . . . "	. . .	.12	.15	.20	.25	.40	.50	.85	1.35	1.90	3.75	4.75	6.75	. . .	9.00	11.00
60°, Blk., Pla. & Bd. "	. . .	. . .	. . .	. . .	. . .	. . .	.30	.45	.65	. . .	. . .	. . .	. . .	. . .	. . .	. . .
60°, Galv., " " "	. . .	. . .	. . .	. . .	. . .	. . .	.45	.70	1.05	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Street, Blk., Strt. . . "	.08	.10	.10	.12	.20	.25	.40	.55	.90	1.05	2.25	. . .	3.50	. . .	. . .	. . .
" " Red . . "	. . .	. . .	. . .	. . .	.20	.25	.40	.55	.90	1.05	2.25	. . .	3.50	. . .	. . .	. . .
" Galv., Strt. . . "	.10	.12	.12	.15	.28	.35	.55	.80	1.30	2.25	3.50	. . .	. . .	. . .	. . .	. . .
" " Red. . "	. . .	. . .	. . .	. . .	.28	.35	.55	.80	1.30	2.25	. . .	. . .	. . .	. . .	. . .	. . .
Side Outlet, Blk., Strt. "	. . .	.08	.08	.10	.18	.30	.45	.60	1.00	. . .	. . .	. . .	. . .	. . .	. . .	. . .
" " " Red. "	. . .	. . .	.08	.10	.18	.30	.45	.60	1.00	. . .	. . .	. . .	. . .	. . .	. . .	. . .
" " Galv., Strt. "	. . .	.10	.10	.15	.25	.45	.65	.90	1.50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
" " " Red. "	. . .	. . .	.10	.15	.25	. . .	.65	.90	1.50	. . .	. . .	. . .	. . .	. . .	. . .	. . .

DROP ELBOWS

Size.....inches	1/4	3/8	1/2	3/4	Size.....inches	1/4	3/8	1/2	3/4
Female, Blk., Strt. . . . . each	.06	.08	.12	.20	M. & F. Galv., Strt. . . . each	. . .	.12	.20	. . .
" " Red. . . . . "	. . .	.08	. . .	.20	" " " Red. . . . "	. . .	.12	.20	. . .
" Galv., Strt. . . . . "	.09	.12	.20	.35	Long M. & F., Blk., Strt. "	. . .	.10	.18	. . .
" " Red . . . . "	. . .	.12	. . .	.35	" " " " Red. "	. . .	.10	.18	. . .
M. & F. Blk., Strt. . . . . "	. . .	.08	.12	. . .	" " " Galv., Strt. . . "	. . .	.18	.27	. . .
" " " Red. . . . . "	. . .	.08	.12	. . .	" " " " Red. . . "	. . .	.18	.27	. . .

TEES

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Blk., Pla., Strt. . . each	.07	.08	.09	.11	.15	.25	.30	.45	.60	. . .	. . .	. . .	. . .	. . .	. . .	. . .
" " Red. . . "	. . .	.08	.09	.11	.15	.25	.30	.45	.60	. . .	. . .	. . .	. . .	. . .	. . .	. . .
" Bd., Strt. . . . "	. . .	.08	.09	.11	.15	.25	.30	.45	.60	1.05	1.70	2.50	3.40	4.25	5.00	7.75
" " Red. . . . "	. . .	.08	.09	.11	.15	.25	.30	.45	.60	1.05	1.70	2.50	3.40	4.25	5.00	7.75
Galv., Pla., Strt. . . "	.09	.10	.13	.16	.20	.38	.50	.70	1.00	. . .	. . .	. . .	. . .	. . .	. . .	. . .
" " Red. . . "	. . .	.10	.13	.16	.20	.38	.50	.70	1.00	. . .	. . .	. . .	. . .	. . .	. . .	. . .
" Bd., Strt. . . "	. . .	.10	.13	.16	.20	.38	.50	.70	1.00	1.90	3.00	4.25	5.75	. . .	8.00	12.00
" " Red. . . "	. . .	.10	.13	.16	.20	.38	.50	.70	1.00	1.90	3.00	. . .	5.75	. . .	8.00	12.00
Serv., Blk., Strt. . . "	. . .	. . .	.12	.15	.25	.35	.50	.75	1.15	2.00	2.50	. . .	. . .	. . .	. . .	. . .
" " Red. . . "	. . .	. . .	. . .	. . .	.25	.35	.50	.75	1.15	2.00	2.50	. . .	4.00	. . .	. . .	. . .
" Galv., Strt. . "	. . .	. . .	.15	.20	.35	.50	.70	1.10	1.65	. . .	. . .	. . .	. . .	. . .	. . .	. . .
" " Red. . "	. . .	. . .	. . .	. . .	. . .	.50	.70	1.10	1.65	. . .	. . .	. . .	. . .	. . .	. . .	. . .

For the Pacific Coast list on Malleable Iron Fittings see pages 24 to 28, inclusive.

STANDARD EASTERN LIST

MALLEABLE IRON FITTINGS

FOUR-WAY TEE

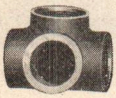


Fig. 32537A

DROP TEE FEMALE

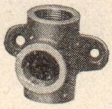


Fig 32537B

PLAIN CROSS

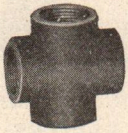


Fig. 32537C

HEADED CROSS

Fig. 32537D

Y BRANCH

Fig. 32537E

FOUR-WAY TEES

Size ..... inches	¼	⅜	½	¾	1	1¼	1½	2
Black ..... each	.12	.12	.14	.20	.35	.50	.80	1.25
Galvanized ..... "	.17	.17	.20	.28	.50	.70	1.10	1.75

DROP TEES

Size ..... inches	⅜	½	¾	1	1¼
Female, Black, Straight ..... each	.10	.14	.22	.30	...
" " Reducing ..... "	.10	.14	.22	.30	...
" Galvanized, Straight ..... "	.15	.25	.40	...	...
" " Reducing ..... "	.15	.25	.40	...	...
M. & F. Black, Straight ..... "	.10	.14	.22	.30	...
" " Reducing ..... "	.10	.14	.22	.30	...
" Galvanized, Straight ..... "	.15	.25	.40	...	...
" " Reducing ..... "	.15	.25	.40	...	...
Long Black, Straight ..... "	.12	...	.30	.40	.60
" " Reducing ..... "	...	...	.30	.40	.60
" Galvanized, Straight ..... "	.17	...	...	...	...
" " Reducing ..... "	.17	...	...	...	...

CROSSES

Size ..... inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Blk. Pla. Strt... ea.	.09	.10	.16	.20	.30	.40	.60	1.00	1.75	3.00	3.35	5.25	7.50	13.00
" " Red... "	.09	.10	.16	.20	.30	.40	.60	1.00	1.75	3.00	3.25	5.25	7.50	13.00
" Bd. Strt... "	.09	.10	.16	.20	.30	.40	.60	1.00	1.75	3.00	3.25	5.25	7.50	13.00
" " Red... "	.09	.10	.16	.20	.30	.40	.60	1.00	1.75	3.00	3.25	5.25	7.50	13.00
Galv. Pla. Strt.. "	.12	.14	.25	.29	.40	.60	.90	1.50	2.75	4.50	....	8.00	....	.....
" " Red.. "	.12	.14	.25	.29	.40	.60	.90	1.50	2.75	4.50	....	8.00	....	.....
" Bd. Strt.. "	.12	.14	.25	.29	.40	.60	.90	1.50	2.75	4.50	....	8.00	....	.....
" " Red.. "	.12	.14	.25	.29	.40	.60	.90	1.50	2.75	4.50	....	8.00	....	.....

45° Y BRANCHES

Size ..... inches	½	¾	1	1¼	1½	2	2½	3	4
Blk. Bd., Strt ..... each	.40	.50	.60	.80	1.00	1.70	2.00	4.00	5.50
" " Red ..... "	.40	.50	.60	.80	1.00	1.70	2.00	4.00	5.50
Galv., Bd., Strt.... "	.60	.75	.90	1.25	1.50	2.50	3.00	6.00	8.25
" " Red..... "	.60	.75	.90	1.25	1.50	2.50	3.00	6.00	8.25

60° Y BRANCHES

Size ..... inches	2x2	2x1½
Black, Plain, Straight ..... each	1.70	1.70
" " Reducing ..... "	1.70	1.70
Galvanized, Plain, Straight ..... "	2.50	2.50
" " Reducing ..... "	2.50	2.50

For the Pacific Coast list on Malleable Iron Fittings see pages 24 to 28, inclusive.

STANDARD EASTERN LIST

MALLEABLE IRON FITTINGS

RETURN BENDS

CLOSE

Fig. 32539A

MEDIUM

Fig. 32539B

OPEN

Fig. 32539C

CLOSE PATTERN RETURN BENDS

Size	inches	½	¾	1	1¼	1½	2
Distance between Centers	"	1	1¼	1½	1¾	2 3/16	2⅝
Right Hand, Black	each	.18	.25	.35	.50	.75	1.00
" " Galvanized	"	.25	.35	.55	.75	1.15	1.65
" and Left, Black	"	.23	.30	.35	.60	.90	1.25
" " " Galvanized	"	.35	.40	.65	.85	1.30	1.90
Left Hand, Black	"	.23	.30	.45	.60	.90	1.25

MEDIUM PATTERN RETURN BENDS

Size	inches	½	¾	1	1¼	1½	2
Distance between Centers	"	1¼	1½	1⅞	2¼	2½	3
Right Hand, Black	each	.18	.25	.35	.50	.75	1.00
" " Galvanized	"	.25	.35	.55	.75	1.15	1.65
" and Left, Black	"	.23	.30	.45	.60	.90	1.25
" " " Galvanized	"	...	.40	.65	...	....	....
Left Hand, Black	"	.23	.30	.45	.60	.90	1.25

OPEN PATTERN RETURN BENDS

Size	inches	½	¾	1	1¼	1½	2	2½	3
Distance bet. Centers	"	1½	2	2½	3	3½	4	4½	5
Right Hand, Black	each	.20	.30	.50	.65	.85	1.25	2.00	3.00
" " Galvanized	"	.28	.45	.70	.90	1.25	2.00	3.50	5.00
Right and Left, Black	"	.25	.38	.60	.80	1.05	1.55	2.50	3.75
" " " Galvanized	"	...	.55	.80	1.05	1.50	2.40	....	....
Left Hand, Black	"	.25	.38	.60	.80	1.05	1.55	2.50	3.75

CROSS-OVERS

Size	inches	½	¾	1
Black	each	.20	.30	.45
Galvanized	"	.25	.40	.60

CROSS-OVER TEES

Size	inches	½	¾	2
Galvanized	each	.38	.56	...

OFFSETS

Sizes	inches	¾	1	1¼
Black	each	.25	.40	.75

For the Pacific Coast list on Malleable Iron Fittings see pages 24 to 28, inclusive.

STANDARD EASTERN LIST

MALLEABLE IRON FITTINGS

REDUCER

Fig. 32540A

R. H. COUPLING

Fig. 32540B

R. & L. COUPLING

Fig. 32540C

CAP

Fig. 32540D

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Reducers, Blk. .....each	...	.05	.06	.07	.10	.16	.20	.28	.45	.70	1.00	1.50	1.85	....	....
" Galv..... "	...	.08	.10	.10	.15	.25	.35	.45	.75	1.05	1.65	2.40	3.05	....	....
R. H. Couplings, Blk.. "	...	.03	.05	.07	.10	.14	.20	.25	.35	.60	.90	....	....	....	....
" " " Galv. "	...	.05	.07	.10	.17	.23	.30	.40	.55	.95	1.40	....	....	....	....
R. & L. Couplings, Blk. ..... "	...	.04	.06	.08	.12	.16	.25	.36	.52	.70	1.00	....	....	....	....
" " " " Galv. .... "	...	.06	.09	.10	.17	.25	.35	.55	.75	1.05	1.50	....	....	....	....
Caps, Blk. ..... "	.03	.03	.04	.05	.08	.12	.16	.24	.32	.45	.85	1.00	1.20	2.50	3.50
" Galv..... "	.04	.04	.05	.08	.12	.17	.24	.38	.52	.76	1.30	1.60	2.00	3.50	5.00

BUSHING

Fig. 32540E

LOCKNUT

Fig. 32540F

WASTE NUT

Fig. 32540G

EXTENSION PIECE

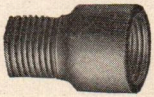


Fig. 32540H

Size ....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Bushings, Blk. .....each	...	.04	.04	.04	.05	.06	.07	.09	.14	.21	....	....	....	....	....	....
" Galv..... "	...	.08	.08	.08	.10	.12	.14	.18	.28	.42	....	....	....	....	....	....
Faced Bushings, Blk. .... "	...	...	.08	.09	.11	.13	.17	.22	.32	.48	.70	1.20	1.50	2.10	2.60	3.75
" " Galv. ... "	...	...	.12	.14	.17	.20	.25	.33	.48	.72	1.05	1.80	2.25	3.15	3.90	5.60
Locknuts, Blk. ..... "	.02	.02	.03	.04	.05	.07	.09	.11	.18	...	....	....	....	....	....	....
" Galv. ..... "	...	.03	.04	.05	.07	.10	.14	.20	.30	...	....	....	....	....	....	....
Waste Nuts, Blk. ..... "	...	.04	.05	.06	.08	.10	.15	.25	...	...	....	....	....	....	....	....
" " Galv..... "	...	.08	.10	.12	.16	.20	.30	.50	...	...	....	....	....	....	....	....
Extension Pieces, Blk. ... "	...	...	.06	.09	.12	...	...	...	...	...	....	....	....	....	....	....
" " Galv. ... "	...	...	.09	.13	.18	...	...	...	...	...	....	....	....	....	....	....

WALL PLATE

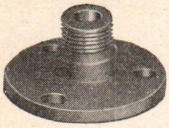


Fig. 32540J

Size.....inches	3/8	1/2	3/4
Wall Plates, Black.....each	.36	.42	.50
Chandelier Hooks, or Loops, Blk., Female "	.17	.26	...

Can furnish male hooks when so specified.

CHANDELIER HOOK

Fig. 32540K

For the Pacific Coast list on Malleable Iron Fittings see pages 24 to 28, inclusive.

MALLEABLE IRON FITTINGS

APPROXIMATE WEIGHT OF BLACK, FLAT BAND MALLEABLE FITTINGS

WEIGHT IN POUNDS PER 100 PIECES

Size.....inches	¼	⅜	½	¾	1	1¼
Ells	13	17	27	39	68	105
Street Ells	11	18	26	40	70	109
45° Ells	9	14	18	32	50	80
S. O. Ells	..	17	27	48	77	100
Tees	14	21	32	48	71	128
S. O. Tees	..	23	29	46	84	103
Crosses	..	21	42	54	96	152
Caps	..	..	..	..	..	56
Reducers	..	..	..	..	..	67
Couplings, R. & L	9	16	19	29	50	77
Return Bends, Close Pattern	..	..	38	68	90	148
" " Medium Pattern	..	..	38	57	90	142
" " Open Pattern	..	..	40	81	111	173
Locknuts	3	4	7	12	18	22
Y Bends	..	..	44	65	109	181
Offsets	..	..	..	63	120	120

Size.....inches	1½	2	2½	3	3½	4
Ells	131	233	420	637	940	1100
Street Ells	140	257	423	720	...	925
45° Ells	103	197	350	483	665	775
S. O. Ells	145	219	...	...	...	...
Tees	198	285	428	742	1000	1200
S. O. Tees	192	318	...	...	...	...
Crosses	197	340	575	960	1040	1550
Caps	75	120	194	300	315	445
Reducers	87	145	260	400	550	675
Couplings, R. & L	101	172	300	380	...	...
Return Bends, Close Pattern	212	270	...	...	...	...
" " Medium Pattern	202	370	...	...	...	...
" " Open Pattern	285	435	700	1000	...	...
Locknuts	31	45	..	..	..	..
Y Bends	253	380	550	960	...	1570

Galvanized fittings, 5 per cent heavier. Plain gas fittings, 10 per cent lighter.

TESTED MALLEABLE IRON FITTINGS

Malleable fittings, tested to 200 pounds air pressure or 250 pounds water pressure, made to order. Price according to quantity wanted.

Always state whether fittings are to be used for steam, water, gas or air.

AIR BRAKE FITTINGS

We are prepared to quote you on specially tested malleable fittings for air brake use.

All our fittings are threaded to a uniform gauge, which steamfitters will appreciate

We are prepared to furnish extra heavy malleable iron fittings for steam working pressures up to 250 pounds; also hydraulic malleable iron fittings for working pressures up to 2000 pounds.

STANDARD MALLEABLE IRON FITTINGS

CLASSIFICATION AND PRICE LIST

EFFECTIVE SEPTEMBER 15, 1919

PLAIN

ELBOWS

Size, Inches	Class
1/8, 1/4x1/8, 3/8x1/8	A
1/4, 3/8x1/4, 3/8, 1/2x1/4, 1/2x3/8, 1/2, 3/4x3/8, 3/4x1/2, 1x3/8, 1x1/2	B
3/4, 1x3/4 and larger	C

60° ELBOWS

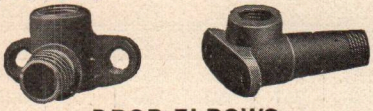
1 1/2, 2	B

SIDE OUTLET ELBOWS

3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	B

DROP ELBOWS

1/4, 3/8, 1/2, 3/4	B

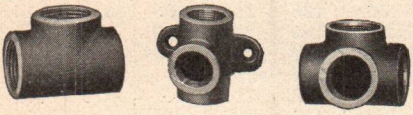


DROP ELBOWS
MALE AND FEMALE

3/8	B

LONG DROP ELBOWS

3/8, 1/2	B



TEES

1/8, 1/4x1/8, 3/8x1/8	A
1/4x3/8, 1/4, 3/8 to 3/4x1/2, 1x3/8x1 to 1x3/4x1/2, 1x1/4 to 1x1/2, 1 1/4x3/8, 1 1/4x1/2, 1 1/2x3/8, 1 1/2x1/2	B
3/4, 3/4x1, 1x3/4x3/4, 1x3/4x1, 1x3/4 to 1 1/4x1x1 1/4, 1 1/4x3/4 to 1 1/2x1 1/4x1 1/2, 1 1/2x3/4 and larger	C

DROP TEES

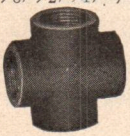
3/8, 1/2x3/8, 1/2, 3/4x1/2, 3/4	B

DROP TEES
MALE AND FEMALE

3/8	B

FOUR-WAY TEES

3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	B



CROSSES

1/4 to 1	B
1 1/4 " 2	C

Straight and reducing.

CAPS

Size, Inches	Class
1/8 ...A; 1/4 to 1...B; 1 1/4 to 2...	C

REDUCERS

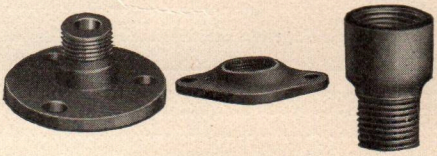
1/4x1/8, 3/8x1/8	A
3/8x1/4, 1/2x3/8 to 1 1/4x1/2, 1 1/2x1/2	B
1 1/4x3/4, 1 1/4x1, 1 1/2x3/4 to 2x1 1/2	C

LOCKNUTS

1/8...A; 1/4 to 1 1/4...B; 1 1/2 to 4...	C

COUPLINGS—RIGHT HAND

1/8....A; 1/4 to 3/4....B; 1 to 2....	C



WASTE NUTS

1/4 to 2	B

WALL PLATES

3/8, 1/2	B

EXTENSION PIECES

3/8 to 2	B

CHANDELIER HOOKS

3/8, 1/2, Male or Female	B

CHANDELIER LOOPS

3/8, 1/2, Male; 3/8, Female	B

BRANCHES

2, 2x1 1/2, 2x1 1/2x2, 2x1 1/2x1 1/2	B

RETURN BENDS

3/8, A; 1/2 to 1, B; 1 1/4 to 2	C

Class	Price, per Pound Black	Galv.
A	.46	.58
B	.23	.33
C	.15	.23

All fittings other than standard take 25 per cent extra charge to the above list in their respective classes.

STANDARD MALLEABLE IRON FITTINGS

CLASSIFICATION AND PRICE LIST

EFFECTIVE SEPTEMBER 15, 1919

BEADED OR BANDED

ELBOWS

Size, Inches	Class
1/8	A
1/4 to 3/4x1/2, 1x3/8, 1x1/2, 1 1/4x1/2	B
3/4, 1, 1x3/4, 1 1/4x3/4 and larger	C

RIGHT AND LEFT ELBOWS

1/4, 3/8, 1/2	A
3/4, 1, 1 1/4, 1 1/2, 2	B

45° ELBOWS

1/8	A
1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	B
2 1/2, 3, 3 1/2, 4, 4 1/2, 5, 6	C

90° STREET ELBOWS

1/8	A
1/4 to 1/2, 3/4x1/2, 3/4, 1x3/4	B
1, 1 1/4x1 and larger	C

45° STREET ELBOWS

3/8	A
1/2, 3/4, 1, 1 1/4, 1 1/2, 2	B

TEES

1/8	A
1/4x3/8 to 3/4x1/2, 1x3/8x1 to 1x3/4x1/2, 1x1/4 to 1x1/2, 1 1/4x3/8x1 1/4, 1 1/4x1/2x1 1/4, 1 1/4x1x1/2, 1 1/2x1/2x1 1/2, 1 1/2x1/2, 2x3/8, 2x1/2	B
3/4x1, 3/4, 1x3/4x3/4, 1x3/4x1, 1x3/4, 1x1 1/4, 1x1 1/2, 1, 1 1/4x3/4x3/4, 1 1/4x3/4x1, 1 1/4x3/4x1 1/4, 1 1/4x1x3/4, 1 1/4x1x1, 1 1/4x1x1 1/4, 1 1/4x3/4 to 1 1/4x2, 1 1/4, 1 1/2x3/4x3/4 to 1 1/2x1 1/4x1 1/2, 1 1/2x3/4 to 2x1 1/2x2, 2x3/4 to 6	C

SERVICE TEES

3/8, 1/2, 3/4, 1x3/4	B
1, 1 1/4x3/4x1 1/4, 1 1/4x1x1 1/4, 1 1/4, 1 1/2x1 1/4x1/2, 1 1/2, 2x1 1/2x2, 2	C

CROSSES

Size, Inches	Class
1/4 to 1, 1 1/4x1/2	B
1 1/4x3/4 to 6	C

CAPS

1 1/4 to 6	C

REDUCERS

3/8x1/4 to 1 1/4x1/2, 1 1/2x1/2, 2x3/8, 2x1/2,	B
1 1/4x3/4, 1 1/4x1, 1 1/2x3/4, 1 1/2x1, 1 1/2x1 1/4, 2x3/4 to 4x3 1/2	C

Y BENDS

1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4	B

COUPLINGS—RIGHT HAND

1 1/4 to 4	C

COUPLINGS—RIGHT AND LEFT

1/4 to 3/4	B
1 " 2	C

RETURN BENDS

MEDIUM PATTERN

1/2, 3/4, 1	B
1 1/4, 1 1/2, 2	C

RETURN BENDS OPEN PATTERN

3/8, 1/2, 3/4, 1	B
1 1/4, 1 1/2, 2, 2 1/2, 3	C

Class	Price, per Pound Black	Galv.
A	.46	.58
B	.20	.28
C	.13	.20

All fittings other than standard take 25 per cent extra charge to the above list in their respective classes.

MALLEABLE IRON FITTINGS

PLAIN ELBOW

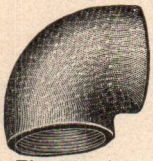


Fig. 7390A

BEADED ELBOW

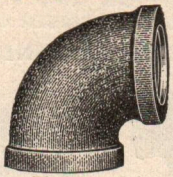


Fig. 7390B

45° ELBOW, BEADED

Fig. 7390C

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Blk., Pla., Strt..ea.	.12	.10	.14	.16	.15	.27	.44	.49	.86	....	....	....	....	....	....	....
" " Red... "	...	.20	.18	.21	.32	.35	.56	.63	1.10	....	....	....	....	....	....	....
" Bd., Strt... "	.13	.11	.16	.19	.18	.30	.48	.60	1.00	2.00	3.00	4.00	6.50	9.00	15.00	20.00
" " Red.... "	...	.22	.20	.24	.36	.40	.60	.70	1.30	2.50	3.75	4.80	8.00	11.00	18.00	24.00
" " R. & L. "	...	.34	.38	.30	.48	.80	.72	1.00	1.80	....	....	....	....	....	....	....
Galv. Pla., Strt. "	.16	.15	.23	.25	.25	.45	.72	.80	1.43	....	....	....	....	....	....	....
" " Red... "	...	.28	.28	.32	.48	.58	.95	1.03	1.85	....	....	....	....	....	....	....
" Bd., Strt.. "	.18	.16	.24	.28	.28	.50	.78	1.00	1.70	3.50	5.00	6.65	10.75	15.00	25.00	33.00
" " Red... "	...	.30	.29	.36	.54	.64	1.00	1.20	2.20	4.40	6.20	8.00	13.50	18.50	30.00	40.00
" " R. & L. "	...	.45	.55	.47	.70	1.20	1.20	1.65	3.00	....	....	....	....	....	....	....
45° Blk., Pla.... "	...	.08	.10	.15	.26	.38	.70	.80	1.25	....	....	....	....	....	....	....
" " Bd..... "	...	.08	.10	.17	.28	.42	.80	.90	1.30	2.10	2.90	4.00	5.80	6.30	7.80	12.00
" Galv., Pla... "	...	.12	.15	.24	.38	.56	1.05	1.20	1.85	....	....	....	....	....	....	....
" " Bd.... "	...	.12	.17	.25	.42	.64	1.20	1.30	2.00	3.50	4.80	6.70	9.70	10.50	13.00	19.00
60° Blk..... "	...	...	...	...	...	.44	.80	.90	1.50	....	....	....	....	....	....	....
" Galv..... "	...	...	...	...	...	.64	1.20	1.30	2.25	....	....	....	....	....	....	....

STREET ELBOW

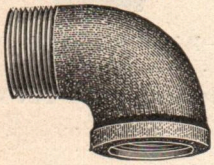


Fig. 7390D

SIDE OUTLET ELBOW

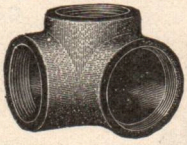


Fig. 7390E

DROP ELBOW, FEMALE

Fig. 7390F

Size.....in.	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Street, Blk., Strt.....each	.16	.10	.14	.22	.38	38	.57	.68	1.30	2.50	4.30	....	10.00
" " Red..... "	...	...	...	...	.44	70	.70	.85	1.60	3.00	5.20	....	12.00
" Galv., Strt..... "	.27	.15	.21	.32	.58	64	.95	1.15	2.20	4.20	7.20	....	17.00
" " Red..... "	...	...	...	...	.64	1.02	1.15	1.40	2.70	5.00	8.60	....	20.00
Side Outlet, Blk., Strt.. "	...	...	.17	.27	.48	77	1.15	1.45	2.50	....	....	....	....
" " " Red.. "	...	...	.20	.32	.58	92	1.38	....	....	....	....	....	....
" " Galv., Strt. "	...	...	.27	.39	.71	1.15	1.70	2.10	3.70	....	....	....	....
" " " Red. "	...	...	.32	.47	.85	1.35	2.00	....	....	....	....	....	....

DROP ELBOWS

Size.....inches	1/4	3/8	1/2	3/4	1
Female, Blk., Strt....each	.15	.19	.25	.46	.80
" " Red..... "	...	.23	.30	.55	.96
" Galv., Strt... "	.22	.28	.36	.67	1.20
" " Red... "	...	.34	.44	.81	1.40
M. & F. Blk., Strt..... "	.15	.21	.35	...	....
" " " Red..... "	...	.25	.42	...	....

Size.....inches	1/4	3/8	1/2
M. & F. Galv., Strt.....ea.	.22	.31	.52
" " " Red..... "	...	.37	.62
Long M. & F. Blk., Strt. "	.20	.43	.55
" " " " Red... "	...	.52	.66
" " " Galv., Strt "	.29	.63	.81
" " " " Red. "	...	.76	1.00

Fittings 3/8 or 1/2-inch reducing to 1/8-inch, double reducing list.
Fittings 1-inch and larger reducing to 1/2-inch or smaller, double reducing list.

MALLEABLE IRON FITTINGS

PLAIN TEE

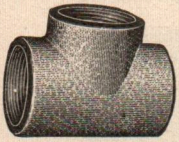


Fig. 7391A

BEADED TEE

Fig. 7391B

SERVICE TEE

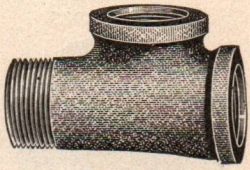


Fig. 7391C

Size ..... inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Blk. Pla. Strt. ea.	.16	.12	.20	.22	.20	.32	.50	.72	1.20	....	....	....	....	....	....	....
" " Red. "	...	.23	.24	.28	.43	.40	.65	.95	1.50	....	....	....	....	....	....	....
" Bd. Strt. "	.18	.14	.22	.25	.23	.35	.60	.80	1.35	2.40	3.70	4.80	7.50	10.00	16.00	23.00
" " Red. "	...	.27	.26	.33	.48	.45	.77	1.00	1.75	3.00	4.60	6.00	9.30	12.00	19.00	28.00
Galv. Pla. Strt, "	.23	.18	.29	.32	.34	.53	.85	1.20	2.00	....	....	....	....	....	....	....
" " Red. "	...	.32	.35	.40	.65	.68	1.05	1.55	2.50	....	....	....	....	....	....	....
" Bd. Strt "	.25	.20	.32	.37	.38	.58	1.00	1.35	2.35	4.00	6.10	8.00	12.50	17.00	27.00	38.00
" " Red. "	...	.40	.40	.48	.72	.74	1.30	1.70	2.90	5.00	7.60	10.00	15.50	20.00	32.00	46.00
Serv. Blk. Strt. "	...	...	.18	.30	.48	.44	.72	.95	1.65	3.15	4.70	....	9.60	....	....	....
" " Red. "	...	...	...	...	.60	.88	.90	1.20	2.10	3.75	5.60	....	11.50	....	....	....
" Galv. Strt. "	...	...	.26	.45	.71	.72	1.20	1.60	2.75	5.20	7.80	....	16.00	....	....	....
" " Red. "	...	...	...	...	.88	1.30	1.50	1.95	3.40	6.25	9.40	....	19.00	....	....	....

FOUR-WAY TEE

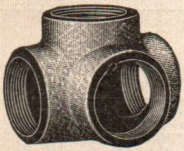


Fig. 7391D

DROP TEE, FEMALE

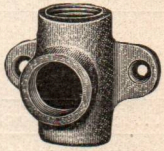


Fig. 7391E

FOUR-WAY TEES

Size ..... inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Black ..... each	.23	.36	.47	.85	1.40	2.00	3.20
Galvanized ..... "	.34	.53	.70	1.25	2.00	2.80	4.70

DROP TEES

Size ..... inches	1/4	3/8	1/2	3/4	1	1 1/4
Female, Black, Straight ..... each	.15	.22	.34	.55	.75	....
" " Reducing ..... "	...	.26	.40	.66	.90	....
" Galvanized, Straight ..... "	.22	.32	.50	.80	1.15	....
" " Reducing ..... "	...	.40	.60	1.00	1.35	....
M. & F. Black, Straight ..... "	...	.22	.34	.55	.75	....
" " Reducing ..... "	...	.26	.40	.66	.90	....
" Galvanized, Straight ..... "	...	.32	.50	.80	1.15	....
" " Reducing ..... "	...	.40	.60	1.00	1.35	....
Long Black, Straight ..... "	...	.35	.40	.65	.85	1 20
" " Reducing ..... "	...	...	...	.80	1.05	1.40
" Galvanized, Straight ..... "	...	.50	.60	.95	1.25	1.75
" " Reducing ..... "	...	...	...	1.15	1.50	2.10

Fittings, 3/8 or 1/2-inch reducing to 1/8-inch, double reducing list.
Fittings, 1-in. and larger reducing to 1/2-in. or smaller, 50% added to reducing list.

MALLEABLE IRON FITTINGS

PLAIN CROSS

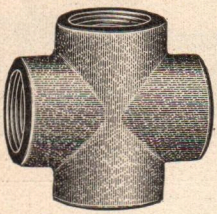


Fig. 7392A

BEADED CROSS

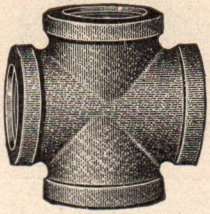


Fig. 7392B

Y BRANCH

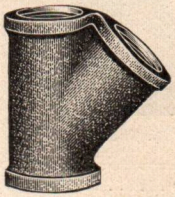


Fig. 7392C

CROSSES

Size..inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Blk. Pla. Strt. ea.	.29	.15	.21	.38	.53	.90	.90	1.10	1.85	....	.....	.....	.....	....	....
" " Red. "	...	...	.25	.46	.64	1.10	1.10	1.35	2.20	....	.....	.....	.....	....	....
" Bd. Strt. "	...	...	.28	.42	.60	.95	1.00	1.20	2.00	3.60	6.00	6.60	11.50	17.50	25.00
" " Red. "	...	...	...	...	...	1.15	1.20	1.40	2.50	4.30	7.30	8.00	14.00	....	....
Galv. Pla. Strt. "	.38	.22	.31	.56	.80	1.30	1.50	1.80	3.00	....	.....	.....	.....	....	....
" " Red. "	...	...	.37	.67	.95	1.55	1.80	2.20	3.70	....	.....	.....	.....	....	....
" Bd. Strt. "	...	...	.40	.62	.90	1.40	1.65	2.20	3.50	6.00	10.00	11.00	19.00	29.00	42.00
" " Red. "	...	...	...	...	...	1.70	2.00	2.40	4.00	7.20	12.00	13.00	23.00	....	....

Y BRANCHES

Size .....inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
45° Blk., Bd., Strt. or Red.....each	.35	.75	.80	1.35	1.85	2.75	6.50	12.00	14.00	18.00
45° Galv., " " " " .. .. "	.52	1.10	1.20	2.00	2.75	4.30	9.50	18.00	21.00	27.00
45° or 60° Blk., Pla., Strt. or Red. "	.32	.70	.75	1.15	1.70	2.10	5.40	10.00	.....	.....
45° " 60° Galv., " " " " " "	.46	1.00	1.10	1.70	2.50	3.10	8.00	15.00	.....	.....
Dble. 45° or 60° Blk., Strt. or Red. "	...	....	....	2.15	3.20	4.70	8.60	.....	.....	.....
" 45° " 60° Galv., " " " "	...	....	....	3.15	5.00	7.00	13.00	.....	.....	.....

CROSS-OVER

Fig. 7392D

CROSS-OVER TEE

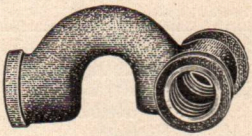


Fig. 7392E

Size.....inches	1/2	3/4	1
Cross-Overs, Black.....each	.20	.30	.45
" " Galvanized..... "	.25	.40	.60
Cross-Over Tees, Galvanized..... "	....	....	...

Fittings 3/8 or 1/2-inch reducing to 1/8, double reducing list. Fittings 1-inch and larger reducing to 1/2-inch or smaller, 50% added to reducing list.

MALLEABLE IRON FITTINGS

RETURN BENDS

CLOSE

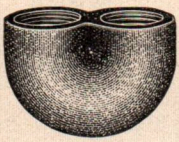


Fig. 7393A

MEDIUM

Fig. 7393B

OPEN

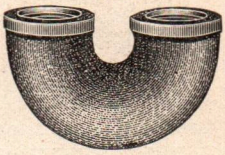


Fig. 7393C

CLOSE PATTERN

Size .....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Distance between Centers.....inches	....	1	1 1/4	1 1/2	1 3/4	2 3/16	2 5/8
R. H. Black .....each	.36	.44	.50	.95	1.25	1.55	2.25
" Galvanized..... "	.55	.70	.75	1.40	2.10	2.50	3.95
R. & L. Black ..... "	.72	.90	.50	.95	2.10	2.55	3.75
" Galvanized ..... "	.96	1.25	.75	1.40	3.10	3.75	5.50

MEDIUM PATTERN

Size .....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Distance between Centers.....inches	....	1 1/4	1 1/2	1 7/8	2 1/4	2 1/2	3
R. H. Black .....each	.38	.50	.55	1.05	1.40	1.70	2.50
" Galvanized..... "	.57	.72	.80	1.50	2.30	2.80	4.25
R. & L. Black ..... "	.80	1.00	.55	1.05	2.30	2.75	4.25
" Galvanized ..... "	1.05	1.30	.80	1.50	3.35	4.10	6.25

OPEN PATTERN

Size .....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Distance between Centers..inches	1 1/2	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
R. H. Black .....each	.42	.54	.67	1.15	1.50	2.65	3.40	5.00	7.50
" Galvanized.... "	.62	.80	1.00	1.65	2.50	4.35	5.65	8.50	12.50
R. & L. Black..... "	.85	1.10	.70	1.15	2.50	4.40	5.65	8.50	12.50
" Galvanized.. "	1.10	1.40	1.00	1.65	3.70	6.50	8.50	12.50	18.00

OFFSETS—Not Illustrated

Size .....inches	3/4	1
Price, Black.....each	.25	.40

MALLEABLE FITTINGS.

REDUCER

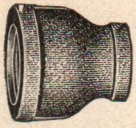


Fig. 7394A

R. H. COUPLING

Fig. 7394B

R. & L. COUPLING

Fig. 7394C

CAP

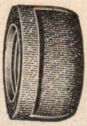


Fig. 7394D

Size.....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Reducers, Black....each	..	.14	.12	.18	.25	.40	.40	.52	.90	1.60	2.40	3.20	4.00	...	...
" Galv..... "	..	.20	.18	.27	.38	.60	.70	.86	1.45	2.60	4.00	5.40	6.75	...	...
R. H. Couplings, Blk. "	.14	.08	.13	.18	.30	.30	.43	.60	.95	1.75	2.80	...	...	...	...
" " " Galv. "	.20	.13	.20	.27	.46	.52	.70	1.00	1.55	3.00	3.70	...	...	...	...
R. & L. " Blk. "	.19	.11	.19	.25	.37	.36	.55	.75	1.25	2.20	2.80	...	...	...	...
" " Galv. "	.27	.17	.30	.37	.55	.60	.95	1.25	2.00	3.60	4.60	...	...	...	...
Caps, Blk. ..... "	.10	.07	.10	.12	.20	.26	.38	.45	.75	1.20	1.80	2.20	3.00	4.80	7.20
" Galv..... "	.15	.11	.15	.18	.28	.38	.65	.75	1.20	2.00	3.00	3.50	5.00	8.00	12.00

Reducers, 1¼-in. and larger reducing to ½-in. or smaller, 50% added to reducing list.

BUSHING

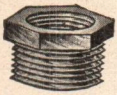


Fig. 7394E

FACED BUSHING

Fig. 7394F

LOCKNUT

Fig. 7394G

WASTE NUT

Fig. 7394H

EXTENSION PIECE

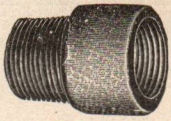


Fig. 7394J

Size .....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Bushings, Blk. ...each	...	.04	.04	.04	.05	.06	.07	.09	.14	.21	...	...	...	...	...	...
" Galv... "	...	...	.08	.08	.10	.12	.14	.18	.28	.42	...	...	...	...	...	...
Faced Bushings, Blk.. "	...	...	...	.09	.11	.13	.17	.22	.32	.48	.70	1.20	1.50	2.10	2.60	3.75
Locknuts, Blk. .. "	.07	.05	.06	.10	.20	.28	.38	.38	.54	.90	1.20	1.80	2.20	...	...	...
" " Galv. .. "	.12	.08	.10	.15	.30	.42	.57	.52	.89	1.45	1.90	3.20	3.60	...	...	...
Waste " Blk. .. "	...	.07	.11	.13	.18	.20	.38	.85	1.20	...	...	...	...	...	...	...
" " Galv.... "	...	.12	.17	.20	.27	.30	.57	1.25	1.75	...	...	...	...	...	...	...
Extension Pieces, Blk. .. "	...	.10	.12	.24	.35	.55	.85	1.20	1.50	...	...	...	...	...	...	...
" " Galv. .. "	...	.16	.18	.35	.50	.85	1.25	1.75	2.25		...	...	...	...	...	...

WALL PLATE

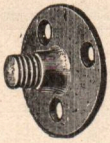


Fig. 7394K

Size .....inches	⅜	½	¾
Wall Plates, Black.....each	.36	.42	.50
Chandelier Hooks, or Loops, Blk. Female... "	.17	.26	....

CHANDELIER HOOK

Fig. 7394L

EXTRA HEAVY MALLEABLE IRON FITTINGS

For Steam Working Pressures Up to 250 Pounds

ELBOW

Fig. 23562A

45° ELBOW

Fig. 23562B

TEE

Fig. 23562C

CROSS

Fig. 23562D

Size	inches	¼	⅜	½	¾	1	1¼	1½
Price, Elbows	each	.20	.25	.30	.35	.40	.55	.70
" " 45°	"	.25	.30	.35	.42	.50	.65	.85
" " Long Sweep	"	...	...	...	..	.64	.80	1.10
" Tees	"	.30	.40	.45	.50	.60	.80	1.05
" Crosses	"	.60	.80	.90	1.00	1.20	1.60	2.10
" Reducers	"	...	...	.28	.30	.40	.45	.55
Size	inches	2	2½	3	3½	4	5	6
Price, Elbows	each	.90	1.50	2.40	3.25	4.25	6.50	9.50
" " 45°	"	1.10	1.85	2.85	4.00	5.00	7.50	10.50
" " Long Sweep	"	1.60	2.40	4.50	6.50	7.00	13.00	17.50
" Tees	"	1.35	2.25	3.60	5.00	6.50	9.75	14.25
" Crosses	"	2.70	4.50	7.20	10.00	13.00	19.50	28.50
" Reducers	"	.70	1.30	2.25	.....	.....	.....	.....

Galvanized extra heavy malleable fittings, 50 per cent advance on above lists.
Reducing elbows and tees carried in stock furnished at same price as straight sizes.

HYDRAULIC

ELBOW

Fig. 23562E

45° ELBOW

Fig. 23562F

TEE

Fig. 23562G

CROSS

Fig. 23562H

Size	inches	¼	⅜	½	¾	1	1¼	1½	2	2½
Price, Elbows	each	.20	.25	.30	.35	.40	.55	.70	.90	1.50
" 45° Elbows	"	.25	.30	.35	.42	.50	.65	.85	1.10	1.85
" L. S. Elbows	"	...	...	...	...	.64	.80	1.10	1.60	2.40
" Tees	"	.30	.40	.45	.50	.60	.80	1.05	1.35	2.25
" Crosses	"	.60	.80	.90	1.00	1.20	1.60	2.10	2.70	4.50
" Reducers	"	...	...	...	.30	.40	.45	.55	.70	....
Size	inches	3	3½	4	5	6	8	10	12	....
Price, Elbows	each	2.40	3.25	4.25	6.50	9.50	21.00	37.00	60.00	....
" 45° Elbows	"	2.85	4.00	5.00	7.50	10.50	.....	.....	.....	....
" L. S. Elbows	"	4.50	6.50	7.00	13.00	17.50	.....	.....	.....	....
" Tees	"	3.60	5.00	6.50	9.75	14.25	32.00	55.00	90.00	....
" Crosses	"	7.20	10.00	13.00	19.50	28.50	.....	.....	.....	....

EXTRA HEAVY HYDRAULIC MALLEABLE FITTINGS WILL BE MARKED FOR THE FOLLOWING HYDRAULIC WORKING PRESSURES

1-inch and Smaller	2000 pounds	5 and 6-inch	800 pounds
1¼ to 2-inch	1500 "	8-inch	600 "
2½ " 4 "	1000 "	10 and 12-inch	500 "

These fittings are tested to hydraulic pressures corresponding to the above working pressures.

MALLEABLE IRON FITTINGS

UNION ELBOWS

FEMALE SLEEVE

Fig. 13515A

MALE SLEEVE

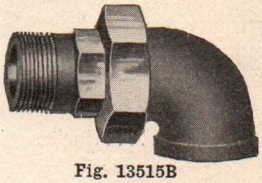


Fig. 13515B

FEMALE SLEEVE

Size.....inches	⅜	½	¾	1	1¼	1½	2	2½
Price, Black.....each	.40	.42	.54	.63	.90	1.05	1.55	2.85
" Galvanized..... "	.60	.63	.81	.95	1.35	1.58	2.35	4.30

MALE SLEEVE

Size.....inches	⅜	½	¾	1	1¼	1½	2	2½
Price, Black.....each	.45	.48	.62	.72	1.05	1.20	1.80	3.30
" Galvanized..... "	.70	.72	.93	1.08	1.60	1.80	2.70	4.95

UNION TEES

MALE SLEEVE

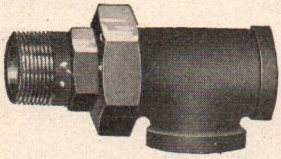


Fig. 13515C

FEMALE SLEEVE

Size.....inches	⅜	½	¾	1	1¼	1½	2	2½
Price, Black.....each	.43	.45	.57	.70	.95	1.15	1.70	3.20
" Galvanized..... "	.65	.68	.86	1.05	1.45	1.75	2.55	4.80

MALE SLEEVE

Size.....inches	⅜	½	¾	1	1¼	1½	2	2½
Price, Black.....each	.50	.52	.65	.80	1.10	1.30	1.95	3.70
" Galvanized..... "	.75	.78	1.00	1.20	1.65	1.95	2.95	5.55

KEWANEE UNION ELLS AND TEES

COMBINATION BRASS AND IRON GROUND BALL JOINTS

UNION ELLS

For 150 Pounds Pressure
WITH FEMALE UNION

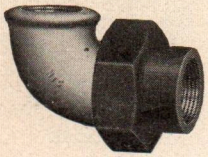


Fig. 19752A

These combination fittings render the use of a separate union and nipple unnecessary. The reduction of the number of joints lessens the liability of leakage and saves time and trouble. Thread connection is non-corrosive. Each fitting tested with extreme air pressure under water. No gasket required.

WITH MALE UNION

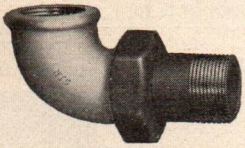


Fig. 19752B

Size Inches	Price, Each Female or Male Black	Price, Each Female or Male Galv.	Size Inches	Price, Each Female or Male Black	Price, Each Female or Male Galv.
¼	.45	.60	1¼	1.80	2.40
⅜	.60	.80	1½	2.40	3.20
½	.75	1.00	2	3.00	4.00
¾	.90	1.20	2½	4.80	6.40
1	1.20	1.60	...	....	....

EXTRA HEAVY UNION ELLS

For 250 Pounds Pressure
WITH FEMALE UNION

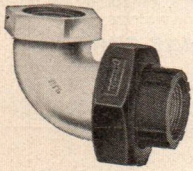


Fig. 19752C

¼	.60	.75	1¼	2.85	3.55
⅜	.80	1.00	1½	3.65	4.55
½	.95	1.20	2	5.70	7.15
¾	1.25	1.55	2½	9.60	12.00
1	1.95	2.45	...	....	....

UNION TEES

For 150 Pounds Pressure
WITH FEMALE UNION

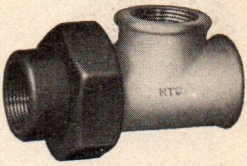


Fig. 19752D

Non-corrosive thread connection. Each fitting tested with extreme air pressure under water. No gasket required. One male Kewanee Union Tee replaces four ordinary fittings. This is recognized as one of the most valuable innovations brought out in recent years.

WITH MALE UNION

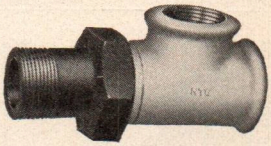


Fig. 19752E

Size Inches	Price, Each Female or Male Black	Price, Each Female or Male Galv.	Size Inches	Price, Each Female or Male Black	Price, Each Female or Male Galv.
¼	.50	.67	1¼	1.98	2.65
⅜	.66	.88	1½	2.64	3.50
¾	.82	1.10	2	3.30	4.40
½	.99	1.32	2½	5.30	7.10
1	1.32	1.75	...	....	....

EXTRA HEAVY UNION TEES

For 250 Pounds Pressure
WITH MALE UNION

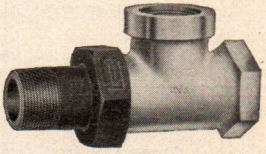


Fig. 19752F

¼	.75	.90	1	2.55	3.20
⅜	.90	1.15	1¼	3.70	4.65
½	1.10	1.40	1½	5.05	6.30
¾	1.50	1.90	2	7.00	8.75

MALLEABLE IRON UNIONS

STANDARD

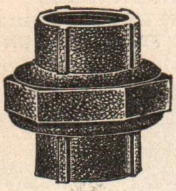


Fig. 10234A

JEFFERSON

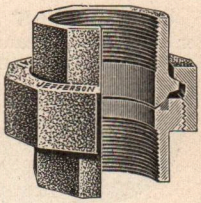


Fig. 10234B

STANDARD

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price, Black.....each	.18	.18	.20	.22	.27	.33	.46	.58	.75	1.55	2.10	3.65	4.35
" Galvanized ... "	.27	.27	.30	.33	.40	.50	.70	.90	1.15	2.35	3.15	5.50	6.50

JEFFERSON

Malleable Iron Ground Ball Joint, Brass to Iron

Size .....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price, Black .....each	.30	.30	.40	.50	.60	.80	1.20	1.60	2.00	3.20	4.80	8.00	10.00
" Galvanized.. "	.45	.45	.60	.75	.90	1.20	1.80	2.40	3.00	4.80	7.20	12.00	15.00

RAILROAD

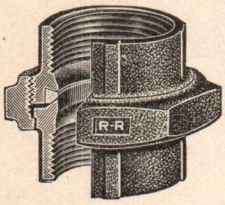


Fig. 10234C

MARK COLD-DRAWN STEEL

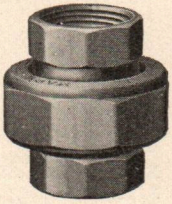


Fig. 10234D

"KEWANEE" OCTAGON

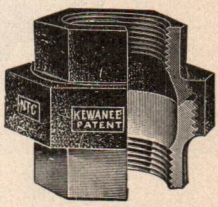


Fig. 10234E

RAILROAD

Brass to Iron Seat

Size.....inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Black.....each	.30	.40	.50	.60	.80	1.20	1.60	2.00	3.20	4.80
" Galvanized..... "	.45	.60	.75	.90	1.20	1.80	2.40	3.00	4.80	6.20

MARK COLD-DRAWN STEEL, BRASS SEAT

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price .....each	.30	.30	.40	.50	.60	.80	1.20	1.60	2.00

KEWANEE

Combination Brass and Iron Ground Ball Joint and Non-corrosive Thread Connection, Octagon or Hexagon Ends

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price, Black.....each	.30	.30	.40	.50	.60	.80	1.20	1.60	2.00	3.20	4.80	6.50	10.00
" Galvanized.... "	.45	.45	.60	.75	.90	1.20	1.80	2.40	3.00	4.80	7.20	9.75	15.00

DART UNIONS

TWO BRONZE SEATS PREVENT CORROSION

FEMALE

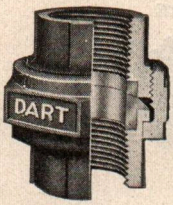


Fig. 2191A

MALE AND FEMALE

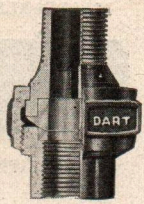


Fig. 2191B

AIR PUMP

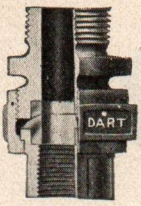


Fig. 2191C

FLANGE UNION

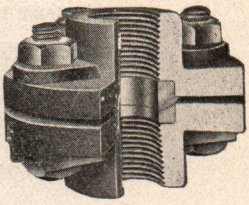


Fig. 2191D

FEMALE

Size ..... inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4
Price, Plain ..... each	.30	.30	.40	.50	.60	.80	1.20
" Galvanized ..... "	.45	.45	.60	.75	.90	1.20	1.80

Size ..... inches	1 1/2	2	2 1/2	3	3 1/2	4	.....
Price, Plain ..... each	1.60	2.00	3.20	4.80	7.20	10.80	.....
" Galvanized ..... "	2.40	3.00	4.80	7.20	10.80	16.20	.....

MALE AND FEMALE

Size ..... inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Plain ..... each	.38	.50	.62	.75	1.00	1.50	2.00	2.50	4.00	6.00

30 per cent advance for galvanized.

AIR PUMP

Size ..... inches	3/4x1	1x1 1/4	1 1/4x1 1/2	1 1/2x2
Price, Plain ..... each	.90	1.20	1.80	2.40

30 per cent advance for galvanized.

FLANGE UNIONS

Absolutely tight joints assured whether *in or out* of alignment. Adapted for high or low pressure. Furnished with bolts and nuts.

Size ..... inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2
Price, Plain ..... each	.55	.60	.80	1.20	1.60	2.00	3.20	4.80	6.00

Size ..... inches	4	4 1/2	5	6	7	8	9	10	12
Price, Plain ..... each	7.50	8.75	10.00	12.50	15.00	18.00	21.60	28.80	46.00

10 per cent net advance for malleable iron flanges. 35 per cent net advance for galvanized flanges. Prices for extra heavy flanges on request.

UNION ELBOWS

FEMALE

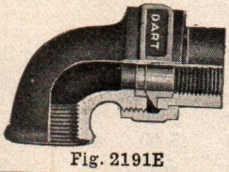


Fig. 2191E

MALE AND FEMALE

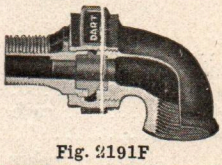


Fig. 2191F

Size ..... inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
Price, Plain ..... each	.45	.60	.75	.90	1.20	1.80	2.40	3.00	4.80

30 per cent advance for galvanized.

FLANGE UNIONS

FACED, NO GASKETS

CAST IRON

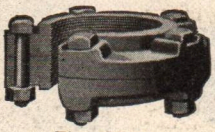


Fig. 3152A

MALLEABLE IRON

Fig. 3152B

CAST IRON

Size ..... inches	½	¾	1	1¼	1½	2	2½
Diameter of Flanges... "	2¾	3⅜	3⅝	4⅛	4½	5⅛	5⅞
Number of Bolts in Each....	3	3	3	4	4	4	4
Price, Black ..... each	.40	.46	.52	.64	.78	1.00	1.25
" Galvanized..... "	.80	.92	1.04	1.28	1.56	2.00	2.50
Size ..... inches	3	3½	4	4½	5	6	7
Diameter of Flanges... "	6⅝	7¼	7¾	8⅜	9⅛	10⅜	11⅝
Number of Bolts in Each....	4	4	5	5	5	6	7
Price, Black ..... each	1.50	1.80	2.10	2.70	3.15	3.95	5.50
" Galvanized..... "	3.00	3.60	4.20	5.40	6.30	7.90	11.00
Size ..... inches	8	9	10	12	14	15	16
Diameter of Flanges... "	12¾	13⅞	15½	17⅞	20⅝	20⅝	23
Number of Bolts in Each....	8	9	10	12	14	14	16
Price, Black ..... each	7.00	10.00	11.50	16.00	28.00	35.00	60.00
" Galvanized..... "	14.00	20.00	23.00	32.00	56.00	70.00	.....

CAST IRON, EXTRA HEAVY

Size ..... inches	½	¾	1	1¼	1½	2
Diameter of Flanges..... "	3	3¼	3⅝	4⅛	4⅝	5⅜
Number of Bolts in Each.....	3	4	4	4	4	5
Price ..... each	.60	.70	.80	1.00	1.15	1.50
Size ..... inches	2½	3	3½	4	4½	5
Diameter of Flanges..... "	6	6¾	7½	8	8¾	9⅜
Number of Bolts in Each.....	5	6	6	7	8	8
Price ..... each	1.90	2.25	2.70	3.15	4.00	4.75
Size ..... inches	6	7	8	9	10	12
Diameter of Flanges..... "	10⅞	12	13¼	14⅜	15¾	18
Number of Bolts in Each.....	9	10	10	12	12	14
Price ..... each	6.00	8.25	10.50	15.00	17.25	24.00

MALLEABLE IRON

Size ..... inches	¾	1	1¼	1½	2	2½	3
Diameter of Flanges..... "	2⅞	3¼	3¾	4⅝	5½	6	6¾
Number of Bolts in Each	3	4	4	4	4	4	4
Price, Black ..... each	1.40	1.60	2.00	2.50	3.00	3.50	4.40
" Galvanized..... "	2.80	3.20	4.00	5.00	6.00	7.00	8.80
Size ..... inches	3½	4	4½	5	6	8	....
Diameter of Flanges..... "	7½	8	8⅝	9⅜	10⅝	13⅛	....
Number of Bolts in Each	4	5	5	5	6	7	....
Price, Black ..... each	5.25	6.00	7.00	8.00	9.00	18.00	....
" Galvanized..... "	10.50	12.00	14.00	16.00	18.00	36.00	....

BRANCH TEES

No. 1, FOR CIRCULATION

Fig. 21A

No. 2, FOR CIRCULATION

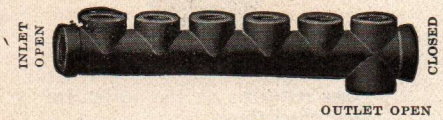


Fig. 21B

No. 3, FOR BOX COILS

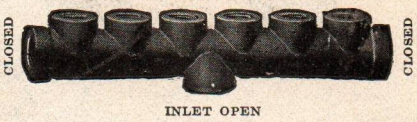


Fig. 21C

Number of Branches	1-inch			1¼-inch			1½-inch			2-inch		
	2½ Inches Center to Center			3 Inches Center to Center			3½ Inches Center to Center			4½ Inches Center to Center		
	Size of Run, Inches											
	1 or 1¼	1½	2	1¼ or 1½	2	2½	1½ or 2	2½	3	2	2½ or 3	3½
2	.90	1.00	1.15	1.30	....	....	2.10	....	....	4.10	....	....
3	1.05	1.15	1.35	1.65	1.90	2.40	2.70	3.45	3.80	5.25	5.75	6.25
4	1.15	1.30	1.60	2.00	2.40	2.85	3.35	4.15	4.60	6.40	7.00	7.75
5	1.35	1.45	1.85	2.40	2.90	3.55	4.00	5.00	5.50	7.65	8.50	9.25
6	1.60	1.75	2.10	2.80	3.30	3.95	4.65	5.75	6.25	8.80	9.75	10.75
7	1.90	2.20	2.45	3.20	3.90	4.20	5.25	6.50	7.25	10.60	11.75	13.00
8	2.20	2.45	2.75	3.60	4.50	4.95	5.85	7.00	7.75	11.50	12.75	14.00
9	2.65	2.90	3.40	4.30	5.25	6.15	6.50	8.25	9.00	12.25	13.50	15.00
10	....	3.30	4.00	4.80	5.85	6.85	7.60	9.25	10.00	13.50	15.00	16.50
11	....	4.50	4.80	5.00	6.25	7.25	8.00	9.75	10.75	....	....	....
12	....	4.75	5.10	5.25	6.50	7.65	8.50	10.50	11.50	....	....	....
13	....	5.50	6.00	6.00	7.00	8.25	....	....	....	....	....	....
14	....	7.00	7.25	6.75	7.75	9.00	....	....	....	....	....	....
15	....	7.50	7.75	7.50	8.50	9.75	....	....	....	....	....	....
16	....	8.00	8.25	8.50	9.50	10.75	....	....	....	....	....	....

Back or side outlets charged as additional front outlets.

All openings in branch tees for circulation are tapped right-hand.

Branch tees for box coils are always tapped left-hand in branches and right-hand in back inlet.

The run and back opening of branch tees are tapped the same size as branches, unless otherwise ordered.

1-inch branch tees, 1-inch or 1¼-inch run, are 1¾ inches inside diameter.

1-inch branch tees, 1½-inch or 2-inch run, are 2¼ inches inside diameter.

1¼-inch branch tees are all 2½ inches inside diameter.

1½-inch branch tees are all 2¾ inches inside diameter.

2-inch branch tees are all 3½ inches inside diameter.

Always order branch tees by size and number.

CAST IRON FITTINGS

LIST OF SIZES

ELBOWS

90°

REDUCING

¼ x ¼	2 x 2	4 x 2½
⅜ x ⅜	2 x 1½	4 x 2
⅜ x ¼	2 x 1¼	4½ x 4½
½ x ½	2 x 1	4½ x 4
½ x ⅜	2 x ¾	5 x 5
½ x ¼	2½ x 2½	5 x 4½
¾ x ¾	2½ x 2	5 x 4
¾ x ½	2½ x 1½	5 x 3
¾ x ⅜	2½ x 1¼	5 x 2½
1 x 1	2½ x 1	6 x 6
1 x ¾	3 x 3	6 x 5
1 x ½	3 x 2½	6 x 4
1 x ⅜	3 x 2	7 x 7
1¼ x 1¼	3 x 1½	7 x 6
1¼ x 1	3 x 1¼	8 x 8
1¼ x ¾	3½ x 3½	8 x 7
1¼ x ½	3½ x 3	8 x 6
1¼ x ⅜	3½ x 2½	9 x 9
1½ x 1½	3½ x 2	10 x 10
1½ x 1¼	4 x 4	10 x 8
1½ x 1	4 x 3½	12 x 12
1½ x ¾	4 x 3	.....

RIGHT AND LEFT ELBOWS

¼	½	1	1½	2½
⅜	¾	1¼	2	3

60° AND 22½° ELBOWS

½	1¼	2½	5
¾	1½	3	6
1	2	4	..

PITCHED ELBOWS

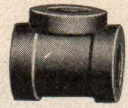
½	1½ x 1	3 x 2½
¾ x ½	1½ x 1¼	3
¾	1½	3½ x 3
1 x ¾	2 x 1½	3½
1	2	4
1¼ x 1	2½ x 2	....
1¼	2½	....

45° ELBOWS

¼	1¼	3½	7
⅜	1½	4	8
½	2	4½	9
¾	2½	5	10
1	3	6	12

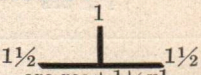
TEES

STRAIGHT



REDUCING ON OUTLET

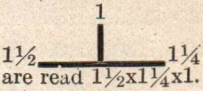
Tees reducing on the outlet are described thus:



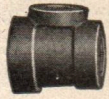
are read 1½x1.

REDUCING ON RUN

Tees reducing on the run are described thus:



are read 1½x1¼x1.



¼x ¼x ¼	1 x ¾x ¾
⅜x ⅜x ⅜	1 x ¾x ½
⅜x ⅜x ¼	1 x ½x1
½x ½x ½	1 x ½x ¾
½x ½x ⅜	1 x ½x ½
½x ½x ¼	1 x ⅜x1
½x ⅜x ½	1 x ¼x1
½x ⅜x ⅜	¾x ¾x1
⅜x ⅜x ½	¾x ½x1
¾x ¾x ¾	½x ½x1
¾x ¾x ½	1¼x1¼x1¼
¾x ¾x ⅜	1¼x1¼x1
¾x ¾x ¼	1¼x1¼x ¾
¾x ½x ¾	1¼x1¼x ½
¾x ½x ½	1¼x1¼x ⅜
¾x ⅜x ¾	1¼x1¼x ¼
¾x ⅜x ⅜	1¼x1 x1¼
¾x ¼x ¾	1¼x1 x1
½x ½x ¾	1¼x1 x ¾
1 x1 x1	1¼x1 x ½
1 x1 x ¾	1¼x ¾x1¼
1 x1 x ½	1¼x ¾x1
1 x1 x ⅜	1¼x ¾x ¾
1 x1 x ¼	1¼x ½x1¼
1 x ¾x1	.....

CAST IRON FITTINGS

LIST OF SIZES—TEES

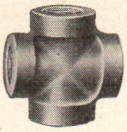
1¼x ¼x1¼	2 x ¾x2	3 x2½x3	4 x3½x3½	5x4 x4½	7x 6x 6
1¼x ½x1	2 x ¾x1½	3 x2½x2½	4 x3½x3	5x4 x4	7x 6x 5
1 x1 x1¼	2 x ½x1½	3 x2½x2	4 x3½x2½	5x4 x3½	7x 6x 4
1 x ¾x1¼	2 x ¼x2	3 x2½x1½	4 x3½x2	5x4 x3	7x 6x 3
¾x ¾x1¼	2 x ½x2	3 x2½x1¼	4 x3½x1½	5x4 x2½	7x 5x 6
1½x1½x1½	1½x1½x2	3 x2½x1	4 x3½x1¼	5x4 x2	7x 5x 5
1½x1½x1¼	1½x1¼x2	3 x2½x ¾	4 x3½x1	5x4 x1½	6x 6x 7
1½x1½x1	1½x1 x2	3 x2 x3	4 x3 x4	5x3½x3½	5x 5x 7
1½x1½x ¾	1½x ¾x2	3 x2 x2½	4 x3 x3½	5x3 x5	8x 8x 8
1½x1½x ½	1¼x1¼x2	3 x2 x2	4 x3 x3	5x3 x4½	8x 8x 7
1½x1¼x1½	1¼x1 x2	3 x2 x1½	4 x3 x2½	5x3 x4	8x 8x 6
1½x1¼x1¼	1¼x ¾x2	3 x2 x1¼	4 x3 x2	5x3 x3½	8x 8x 5
1½x1¼x1	1 x1 x2	3 x2 x1	4 x3 x1½	5x3 x3	8x 8x 4
1½x1¼x ¾	1 x ¾x2	3 x1½x3	4 x3 x1¼	5x3 x2½	8x 8x 3½
1½x1¼x ½	¾x ¾x2	3 x1½x2½	4 x3 x1	5x3 x2	8x 8x 3
1½x1 x1½	2½x2½x2½	3 x1½x2	4 x3 x ¾	5x2½x5	8x 8x 2½
1½x1 x1¼	2½x2½x2	3 x1¼x3	4 x2½x4	5x2½x4	8x 8x 2
1½x1 x1	2½x2½x1½	3 x1 x3	4 x2½x3½	5x2½x3	8x 8x 1½
1½x1 x ¾	2½x2½x1¼	2½x2½x3	4 x2½x3	5x2 x5	8x 8x 1¼
1½x1 x ½	2½x2½x1	2½x2 x3	4 x2½x2½	5x1¼x5	8x 7x 8
1½x ¾x1½	2½x2½x ¾	2½x1½x3	4 x2½x2	4x4 x5	8x 7x 6
1½x ¾x1¼	2½x2½x ½	2 x2 x3	4 x2½x1½	6x6 x6	8x 7x 5
1½x ¾x1	2½x2 x2½	3½x3½x3½	4 x2½x1¼	6x6 x5	8x 7x 4
1½x ¾x ¾	2½x2 x2	3½x3½x3	4 x2½x1	6x6 x4½	8x 7x 3
1½x ½x1½	2½x2 x1½	3½x3½x2½	4 x2 x4	6x6 x4	8x 6x 8
1½x ½x1¼	2½x2 x1¼	3½x3½x2	4 x2 x3	6x6 x3½	8x 6x 7
1½x ⅜x1½	2½x2 x1	3½x3½x1½	4 x2 x2½	6x6 x3	8x 6x 6
1¼x1¼x1½	2½x2 x ¾	3½x3½x1¼	4 x2 x2	6x6 x2½	8x 5x 8
1¼x1 x1½	2½x2 x ½	3½x3½x1	4 x1½x4	6x6 x2	8x 5x 5
1¼x ¾x1½	2½x1½x2½	3½x3½x ¾	4 x1¼x4	6x6 x1½	8x 4x 8
1¼x ½x1½	2½x1½x2	3½x3 x3½	4 x1 x4	6x6 x1¼	8x 4x 6
1 x1 x1½	2½x1½x1½	3½x3 x3	3½x3½x4	6x6 x1	6x 6x 8
1 x ¾x1½	2½x1½x1¼	3½x3 x2½	3 x3 x4	6x5 x6	9x 9x 9
¾x ¾x1½	2½x1½x1	3½x3 x2	2½x2½x4	6x5 x5	9x 9x 7
2 x2 x2	2½x1¼x2½	3½x3 x1½	2 x2 x4	6x5 x4	9x 9x 6
2 x2 x1½	2½x1¼x2	3½x3 x1¼	4½x4½x4½	6x5 x3½	9x 9x 5
2 x2 x1¼	2½x1¼x1½	3½x3 x1	4½x4½x4	6x5 x3	10x10x10
2 x2 x1	2½x1 x2½	3½x3 x ¾	4½x4½x3½	6x5 x2½	10x10x 8
2 x2 x ¾	2½x1 x2	3½x2½x3½	4½x4½x3	6x5 x1½	10x10x 6
2 x2 x ½	2½x ¾x2½	3½x2½x3	4½x4½x2½	6x4 x6	10x10x 5
2 x2 x ¼	2½x ½x2½	3½x2½x2½	4½x4½x2	6x4 x4	10x10x 4
2 x1½x2	2 x2 x2½	3½x2½x2	4½x4½x1½	6x4 x3	10x10x 3
2 x1½x1½	2 x1½x2½	3½x2 x3½	4½x4½x1¼	6x3 x6	10x10x 2
2 x1½x1¼	2 x1¼x2½	3½x1½x3½	4½x4½x1	6x2½x6	10x 8x 8
2 x1½x1	2 x1 x2½	3½x1¼x3½	4½x4 x3	6x2 x6	8x 8x10
2 x1½x ¾	2 x ¾x2½	3½x1 x3½	5 x5 x5	5x5 x6	12x12x12
2 x1½x ½	1½x1½x2½	3 x3 x3½	5 x5 x4½	5x3½x6	12x12x10
2 x1¼x2	1½x1¼x2½	4 x4 x4	5 x5 x4	4x4 x6	12x12x 8
2 x1¼x1½	1½x1 x2½	4 x4 x3½	5 x5 x3½	7x7 x7	12x12x 6
2 x1¼x1¼	3 x3 x3	4 x4 x3	5 x5 x3	7x7 x6	12x12x 5
2 x1¼x1	3 x3 x2½	4 x4 x2½	5 x5 x2½	7x7 x5	12x12x 4
2 x1¼x ¾	3 x3 x2	4 x4 x2	5 x5 x2	7x7 x4	12x 8x10
2 x1 x2	3 x3 x1½	4 x4 x1½	5 x5 x1½	7x7 x3½	12x 8x 8
2 x1 x1½	3 x3 x1¼	4 x4 x1¼	5 x5 x1¼	7x7 x3	.....
2 x1 x1¼	3 x3 x1	4 x4 x1	5 x5 x1	7x7 x2½	.....
2 x1 x1	3 x3 x ¾	4 x4 x ¾	5 x5 x ¾	7x7 x2	.....
2 x1 x ¾	3 x3 x ½	4 x3½x4	5 x4 x5	7x6 x7	.....

CAST IRON FITTINGS

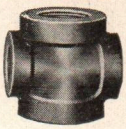
LIST OF SIZES

CROSSES

STRAIGHT



REDUCING



½x ½x ½x ½
¾x ¾x ¾x ¾
¾x ¾x ½x ½
¾x ½x ½x ½
1 x1 x1 x1
1 x1 x ¾x ¾
1 x1 x ½x ½
1 x ¾x ¾x ¾
1¼x1¼x1¼x1¼
1¼x1¼x1 x1
1¼x1¼x ¾x ¾
1¼x1¼x ½x ½
1¼x1 x1 x1
1¼x1 x ¾x ¾
1¼x ¾x ¾x ¾
1½x1½x1½x1½
1½x1½x1¼x1¼
1½x1½x1 x1
1½x1½x ¾x ¾
1½x1½x ½x ½
1½x1¼x1¼x1¼
1½x1¼x1 x1
1½x1¼x ¾x ¾
1½x1 x1 x ¾
1½x1 x1 x ½
1½x1 x ¾x ¾
2 x2 x2 x2
2 x2 x1½x1½
2 x2 x1¼x1¼
2 x2 x1¼x1
2 x2 x1 x1
2 x2 x1 x ¾
2 x2 x ¾x ¾
2 x2 x ½x ½
2 x1½x1½x1½
2 x1½x1¼x1¼
2 x1½x1¼x1
2 x1½x1 x1
2 x1½x1 x ¾
2 x1½x ¾x ¾
2 x1¼x1 x ¾
2 x1 x1½x1
2½x2½x2½x2½
2½x2½x2 x2
2½x2½x2½x1½
2½x2½x2½x2½
2½x2½x2½x1½
2½x2½x2½x1¼
2½x2½x2½x1½
2½x2½x2½x1¼
2½x2½x2½x1
2½x2½x1½x1½
2½x2½x1½x1¼
2½x2½x1¼x1¼
2½x2½x1¼x1
2½x2½x1 x1
2½x2½x1 x ¾
2½x2½x ¾x ¾
2½x2½x1½x1½
2½x2½x1½x1¼
2½x2½x1¼x1¼
2½x2½x1½x1
2½x2½x1 x1
2½x2½x1 x ¾
2½x2½x ¾x ¾
2½x1½x2 x1½
2½x1½x1½x1
2½x1½x1¼x1¼
3 x3 x3 x3
3 x3 x2½x2½
3 x3 x2 x2
3 x3 x2 x1½
3 x3 x2 x1
3 x3 x1½x1½
3 x3 x1½x1¼
3 x3 x1½x1
3 x3 x1½x ¾
3 x3 x1¼x1¼
3 x3 x1¼x1
3 x3 x1¼x ¾
3 x3 x1 x1
3 x3 x ¾x ¾
3 x2½x2½x2
3 x2½x2½x1½
3 x2½x2 x2
3 x2½x2 x1½
3 x2½x2 x1¼
3 x2½x2 x1
3 x2½x2 x ¾
3 x2½x1½x1½
3 x2½x1½x1¼
3 x2½x1¼x1¼
3 x2½x1¼x1
3 x2½x1 x1
3 x2½x1 x ¾
3 x2½x ¾x ¾
4 x4 x4 x4
4 x4 x3½x3½
4 x4 x3 x3
4 x4 x2½x2½
4 x4 x2 x2
4 x4 x2 x1½
4 x4 x1½x1½
4 x4 x1½x1¼
4 x4 x1½x1
4 x4 x1¼x1¼
4 x4 x1¼x1
4 x4 x1 x1
4 x3½x2½x2
4 x3½x2 x2
4 x3½x2 x1½
4 x3½x2 x1¼
4 x3½x1½x1½
4 x3½x1½x1¼
4 x3½x1¼x1¼
4 x3½x1¼x1
4 x3½x1 x1
4 x 3½x 1¼x 1¼
4 x 3½x 1¼x 1
4½x 4½x 4½x 4½
5 x 5 x 5 x 5
5 x 5 x 4 x 4
5 x 5 x 3 x 3
5 x 5 x 2½x 2½
5 x 5 x 2 x 2
5 x 5 x 2 x 1½
5 x 5 x 1½x 1½
5 x 5 x 1½x 1¼
5 x 5 x 1 x 1
5 x 4 x 2 x 2
5 x 4 x 2 x 1½
5 x 4 x 1½x 1½
5 x 4 x 1½x 1¼
5 x 4 x 1¼x 1
5 x 4 x 1 x 1
6 x 6 x 6 x 6
6 x 6 x 5 x 5
6 x 6 x 4 x 4
6 x 6 x 3 x 3
6 x 6 x 2½x 2½
6 x 6 x 2 x 2
6 x 6 x 2 x 1½
6 x 6 x 1½x 1½
6 x 5 x 2 x 2
6 x 5 x 2 x 1½
6 x 5 x 1½x 1½
7 x 7 x 7 x 7
7 x 7 x 6 x 6
7 x 7 x 5 x 5
8 x 8 x 8 x 8
8 x 8 x 7 x 7
8 x 8 x 6 x 6
8 x 8 x 5 x 5
8 x 8 x 4 x 4
9 x 9 x 9 x 9
10 x10 x10 x10
10 x10 x 8 x 8
10 x10 x 7 x 7
12 x12 x12 x12
12 x12 x10 x10
12 x12 x12 x 8
.....

CAST IRON AND MALLEABLE FITTINGS

LIST OF SIZES

REDUCERS

STANDARD

ECCENTRIC

STANDARD REDUCERS

4½x4	5x2½	6x3	8x 6
5 x4½	5x2	6x2½	8x 4
5 x4	6x5	6x2	10x 8
5 x3½	6x4	7x6	10x 6
5 x3	6x3½	8x7	12x10

ECCENTRIC REDUCERS

1¼x ¾	2½x2	4 x3	6x3
1¼x1	3 x1½	4 x3½	6x3½
1½x1	3 x2	4½x4	6x4
1½x1¼	3 x2½	5 x2	6x5
2 x ¾	3½x1¼	5 x2½	7x6
2 x1	3½x2	5 x3	8x5
2 x1¼	3½x2½	5 x3½	8x6
2 x1½	3½x3	5 x4	8x7
2½x1¼	4 x2	5 x4½	...
2½x1½	4 x2½	6 x2½	...

Y BENDS

½ to 12 inches.

LOCKNUTS

2½ to 12 inches.

CAPS

4 to 12 inches.

PLUGS

⅛ to 12 inches.

CAST IRON BUSHINGS

⅜x ⅛	3 x2	6x 4
½x ¼	3 x2½	6x 4½
¾x ¼	3½x1	6x 5
¾x ⅜	3½x1¼	7x 2
1 x ¼	3½x1½	7x 2½
1 x ⅜	3½x2	7x 3
1 x ½	3½x2½	7x 3½
1¼x ¼	3½x3	7x 4
1¼x ⅜	4 x1	7x 4½
1¼x ½	4 x1¼	7x 5
1¼x ¾	4 x1½	7x 6
1½x ¼	4 x2	8x 2
1½x ⅜	4 x2½	8x 2½
1½x ½	4 x3	8x 3
1½x ¾	4 x3½	8x 4
1½x1	4½x2	8x 5
2 x ¼	4½x2½	8x 6
2 x ⅜	4½x3	8x 7
2 x ½	4½x3½	9x 6
2 x ¾	4½x4	9x 7
2 x1	5 x1	9x 8
2 x1¼	5 x2	10x 4
2½x ½	5 x2½	10x 5
2½x ¾	5 x3	10x 6
2½x1	5 x3½	10x 7
2½x1¼	5 x4	10x 8
2½x1½	5 x4½	10x 9
3 x ½	6 x1½	12x 6
3 x ¾	6 x2	12x 8
3 x1	6 x2½	12x10
3 x1¼	6 x3	.....
3 x1½	6 x3½	.....

MALLEABLE BUSHINGS

¼x⅛	¾x ½	1½x1¼
⅜x¼	1 x ¾	2 x1½
½x⅜	1¼x1	2½x2

FACED BUSHINGS

⅜x ¼	2 x1½	4½x 4
½x ⅜	2½x1¼	*5 x 3
¾x ⅜	2½x1½	5 x 4
¾x ½	2½x2	5 x 4½
1 x ½	3 x1½	6 x 3
1 x ¾	3 x2	*6 x 4
1¼x ¾	3 x2½	*6 x 5
1¼x1	3½x2	7 x 5
1½x ¾	3½x2½	7 x 6
1½x1	3½x3	8 x 6
1½x1¼	*4 x2	8 x 7
2 x ¾	4 x2½	10 x 8
2 x1	4 x3	10 x10
2 x1¼	4 x3½	.. ..

*Cast iron. All other sizes made in malleable iron.

STANDARD CAST IRON FITTINGS

ELBOWS

STRAIGHT

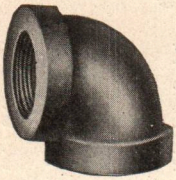


Fig. 3994A

RIGHT AND LEFT ELBOW

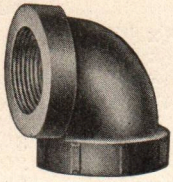


Fig. 3994B

Size Inches	Price, Each — Straight — Black	Straight — Galv.	Right and Left, Black
¼	.05	.10	.06
⅜	.05	.10	.06
½	.06	.12	.07
¾	.08	.16	.09
1	.10½	.21	.12
1¼	.16	.32	.18
1½	.20	.40	.23
2	.28	.56	.32
2½	.50	1.00	.60
3	.75	1.50	.85
3½	1.05	2.10	....
4	1.20	2.40	....
4½	1.75	3.50	....
5	2.00	4.00	....
6	2.75	5.50	....
7	4.70	9.40	....
8	6.75	13 50	....
9	9.00	18 00	....
10	13.50	27.00	....
12	20.00	40.00	....

60° and 22½°

SPECIAL ANGLE

Fig. 3994C

Size Inches	Price, Each 60°	22½°	Size Inches	Price, Each 60°	22½°
½	.25	.25	2½	1.10	1.10
¾	.30	.30	3	1.65	1.65
1	.35	.35	4	2.75	2.75
1¼	.45	.45	5	5.00	5 00
1½	.50	.50	6	7.00	7.00
2	.60	.60	...	....	....

REDUCING

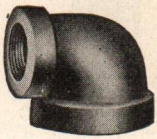


Fig. 3994D

45°

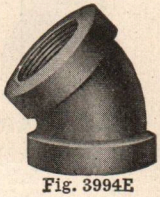


Fig. 3994E

Size Inches	Price, Each — Reducing — Black	Reducing — Galv.	45° — Black	45° — Galv.
⅜	.06	...	.06	.12
½	.07	.14	.07	.14
¾	.09	.18	.10	.20
1	.12	.24	.12	.24
1¼	.18	.36	.19	.38
1½	.23	.46	.24	.48
2	.32	.64	.34	.68
2½	.60	1.20	.60	1.20
3	.85	1.70	.90	1.80
3½	1.20	2.40	1.25	2.50
4	1.40	2.80	1.45	2.90
4½	2.00	4.00	2.20	4.40
5	2.30	4.60	2.50	5.00
6	3.15	6.30	3.45	6.90
7	5.40	10.80	5.90	11.80
8	7.75	15.50	8.50	17.00
9	10.50	21.00	11.25	22.50
10	15.50	31.00	17.00	34.00
12	23.00	46.00	25.00	50.00

PITCHED

Size Inches	Price Each	Size Inches	Price Each
¾	.10	2½	.65
1	.13	3	1.00
1¼	.20	3½	1.30
1½	.25	4	1.50
2	.35	...	....

The demand being limited for galvanized reducing cast iron fittings, they are not carried in stock. Will be furnished made to order only.

These fittings are recessed, which permits of the easy entrance of the pipe. They are uniform in design, both in straight and reducing size, are of good weight, and suitable for working pressures up to 125 pounds.

STANDARD CAST IRON FITTINGS

TEES

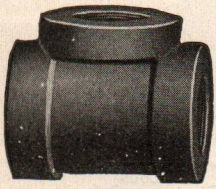


Fig. 3995A

STRAIGHT SIZES

Size In.	Price, Each Black	Price, Each Galv.	Size In.	Price, Each Black	Price, Each Galv.
1/4	.08	.16	3 1/2	1.50	3.00
3/8	.08	.16	4	1.75	3.50
1/2	.09	.18	4 1/2	2.55	5.10
3/4	.12	.24	5	3.00	6.00
1	.15	.30	6	4.00	8.00
1 1/4	.23	.46	7	6.80	13.60
1 1/2	.29	.58	8	9.75	19.50
2	.41	.82	9	13.00	26.00
2 1/2	.73	1.46	10	19.50	39.00
3	1.10	2.20	12	29.00	58.00

REDUCING TEES

ON RUN

Fig. 3995B

ON OUTLET

Fig. 3995C

Size In.	Price, Each Black	Price, Each Galv.	Size In.	Price, Each Black	Price, Each Galv.
3/8	.09	.18	4	2.00	4.00
1/2	.10	.20	4 1/2	2.95	5.90
3/4	.14	.28	5	3.50	7.00
1	.17	.34	6	4.60	9.20
1 1/4	.27	.54	7	7.80	15.60
1 1/2	.33	.66	8	11.25	22.50
2	.47	.94	9	15.00	30.00
2 1/2	.83	1.66	10	22.50	45.00
3	1.25	2.50	12	33.50	67.00
3 1/2	1.75	3.50	..	.....	.....

Tees reducing on the outlet are described thus:

1

1 1/2 ——— 1 1/2

and are read 1 1/2x1

Tees reducing on the run are described thus:

1

1 1/2 ——— 1 1/4

and are read 1 1/2x 1 1/4x1

CROSSES

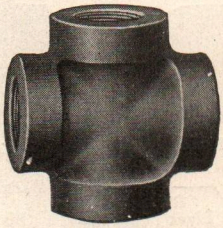


Fig. 3995D

Size Inches	Price, Each Straight Black	Price, Each Straight Galv.	Price, Each Reducing Black	Price, Each Reducing Galv.
1/2	.16	.32	.18	.36
3/4	.22	.44	.25	.50
1	.27	.54	.30	.60
1 1/4	.42	.84	.46	.92
1 1/2	.53	1.06	.60	1.20
2	.75	1.50	.83	1.66
2 1/2	1.30	2.60	1.45	2.90
3	2.00	4.00	2.20	4.40
3 1/2	2.70	5.40	3.00	6.00
4	3.15	6.30	3.50	7.00
4 1/2	4.60	9.20	5.10	10.20
5	5.50	11.00	6.00	12.00
6	7.25	14.50	8.00	16.00
7	12.25	24.50	13.50	27.00
8	17.50	35.00	19.25	38.50
9	23.50	47.00	26.00	52.00
10	35.00	70.00	38.50	77.00
12	52.50	105.00	58.00	116.00

Y BRANCHES

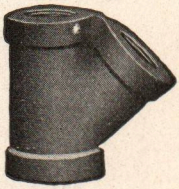


Fig 3995E

Size In.	Price, Each Black	Price, Each Galv.	Size In.	Price, Each Black	Price, Each Galv.
1/2	.20	.40	4	4.00	8.00
3/4	.28	.56	4 1/2	5.90	11.80
1	.34	.68	5	7.00	14.00
1 1/4	.54	1.08	6	9.20	18.40
1 1/2	.66	1.32	7	15.60	31.20
2	.94	1.88	8	22.50	45.00
2 1/2	1.66	3.32	10	45.00	90.00
3	2.50	5.00	12	67.00	134.00
3 1/2	3.50	7.00	..	.....	.....

STANDARD CAST IRON FITTINGS

REDUCERS

Fig. 8723A

CAPS

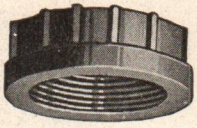


Fig. 8723B

Size In.	Price, Each — Reducers Black	Reducers Galv.	Caps Black	Caps Galv.
¾	.10	....	.05	....
1	.16	....	.08	....
1¼	.22	....	.14	....
1½	.28	....	.20	....
2	.43	....	.26	....
2½	.60	....	.40	....
3	.80	....	.54	....
3½	1.00	....	.75	....
4	1.35	....	.87	1.74
4½	1.85	3.70	1.05	2.10
5	2.00	4.00	1.20	2.40
6	2.70	5.40	1.55	3.10
7	5.35	10.70	2.50	5.00
8	6.75	13.50	2.85	5.70
9	8.35	16.70	4.75	9.50
10	10.00	20.00	5.50	11.00
12	15.00	30.00	7.00	14.00

LOCKNUTS

Fig. 8723C

Size In.	Price, Each — Black	Galv.
2	.25	....
2½	.27	.54
3	.34	.68
3½	.47	.94
4	.64	1.28
4½	.85	1.70
5	.90	1.80
6	1.30	2.60
7	1.70	3.40
8	2.35	4.70
9	2.70	5.40
10	3.00	6.00
12	4.00	8.00

Fittings are of good weight, are suitable for steam working pressures up to 125 pounds, and water working pressures of 175 pounds.

PLUGS

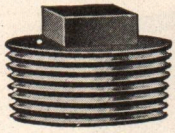


Fig. 8723D

COUNTERSUNK PLUGS

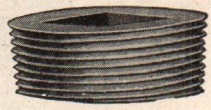


Fig. 8723E

Size In.	Price, Each — Plugs Black	Plugs Galv.	Solid Black	Countersunk Black
⅛	.02	.....	....	....
¼	.02	.04	.04	....
⅜	.02	.04	.04	....
½	.02	.04	.04	.04
¾	.03	.06	.06	.06
1	.04	.08	.08	.08
1¼	.05	.10	.09	.09
1½	.07	.14	.11	.11
2	.10	.20	.15	.15
2½	.18	.36	.27	.30
3	.25	.50	.38	.40
3½	.38	.76	.57	.92
4	.42	.84	.63	1.10
4½	.65	1.30	1.00	....
5	.88	1.75	1.35	2.00
6	1.20	2.40	1.80	3.50
7	1.85	3.70	2.80	....
8	2.75	5.50	4.15	....
9	3.25	6.50	5.00	....
10	3.75	7.50	5.75	....
12	5.00	10.00	7.50	....

BUSHINGS

Fig. 8723F

Size In.	Price, Each Black	Galv.	Size In.	Price, Each Black	Galv.
⅜	.04	.08	4	.50	1.00
½	.04	.08	4½	.75	1.50
¾	.05	.10	5	.93	1.85
1	.06	.12	6	1.25	2.50
1¼	.07	.14	7	1.87	3.75
1½	.09	.18	8	2.75	5.50
2	.14	.28	9	3.25	6.50
2½	.21	.42	10	3.75	7.50
3	.30	.60	12	5.00	10.00
3½	.40	.80	....	....	.....

Fittings tested to 200 pounds air pressure, or 250 pounds water pressure, furnished on special order. Prices will vary according to quantity wanted.

STANDARD CAST IRON FITTINGS

RETURN BENDS

CLOSE PATTERN

Fig. 3998A

OPEN PATTERN

Fig. 3998B

WIDE PATTERN

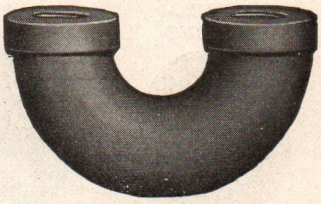


Fig.3998C

Close pattern return bends will not make up parallel coils, as the distance, center to center, of two adjacent bends is greater than the center to center of openings of a single bend.

CLOSE PATTERN

Size.....inches	½	¾	1	1¼	1½	2	2½	3	4
Center to Center....inches	1¼	1½	1¾	2¼	2½	3¼	3¾	4¼	6
Price, R. H., Black....each	.18	.20	.22	.28	.40	.57	1.20	1.70	5.00
" " Galv..... "	.36	.40	.44	.56	.80	1.14	2.40	3.40	10.00
" R. & L., Black.. "	.21	.23	.26	.33	.46	.66	1.40	1.95	5.25
" L. H., Black.... "	.21	.23	.26	.33	.46	.66	1.40	1.95	5.25

CLOSE PATTERN PITCHED

Suitable for Coils as per Table Below

Size.....inches	1	1	1	1	1	1¼	1¼	1¼
Length of Coil.....feet	3	4	5	6	8	4	5	6
Price, R. H.....each	.26	.26	.26	.26	.26	.33	.33	.33

All right and left pitched return bends are made to order. One-inch return bends for coils longer than 8 feet are tapped straight. Pitched return bends have length of coil marked on them.

OPEN PATTERN

Size.....inches	¾	1	1¼	1½	2	2½	3	4
Center to Center.....inches	1⅞	2⅜	3	3½	4½	5½	6½	7½
Price, R. H., Black..... "	.26	.30	.40	.55	.80	1.35	2.20	6.50
" " Galvanized.. "	.52	.60	.80	1.10	1.60	2.70	4.40	10.00
" R. & L., Black..... "	.30	.35	.46	.64	.92	1.55	2.50	....

WITH BACK OUTLET—NOT ILLUSTRATED

Size.....inches	¾	1	1¼	1½	2	2½	3
Center to Center.....inches	1⅞	2¼	2¼	2½	3¼	3¾	4¼
Price, Right-hand, Black.....each	.38	.42	.60	.80	1.15	2.00	3.00
" " " Galvanized.... "	.76	.84	1.20	1.60	2.30	4.00	6.00
" Right and Left, Black..... "	.42	.48	.70	.95	1.30	2.30	3.50

WIDE PATTERN

Size.....inches	1	1	1	1	1	1¼	1¼	1½
Center to Center.....inches	3	4	5	6	8	4	6	4⅞
Price, Black.....each	.45	.50	.60	.75	1.00	1.00	1.25	1.30
" Galvanized..... "	.80	.90	1.10	1.30	1.60	1.75	2.00	2.30

Size.....inches	1½	1½	2	2	2	2	4	....
Center to Center.....inches	6	8	4⅞	6	7	8	11	....
Price, Black.....each	1.60	2.00	1.75	2.00	3.00	3.50	7.50	....
" Galvanized..... "	2.60	3.25	3.00	3.25	4.50	5.00	11.00	....

CAST IRON FITTINGS

ECCENTRIC REDUCING COUPLING

Fig. 18700A

ECCENTRIC BUSHING

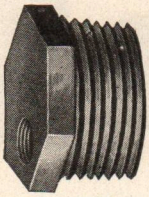


Fig. 18700B

ECCENTRIC REDUCING COUPLINGS

Size Inches	Price Each	Size Inches	Price Each
1¼	.55	4	4.00
1½	.72	4½	5.00
2	1.00	5	6.00
2½	1.50	6	8.00
3	2.40	8	11.00
3½	3.00	...	.....

ECCENTRIC BUSHINGS

Reducing two or more sizes.

Size Inches	Price Each	Size Inches	Price Each
1¼	.22	5	1.85
1½	.25	6	2.50
2	.27	7	3.75
2½	.42	8	5.50
3	.60	9	6.50
3½	.80	10	7.50
4	1.00	12	10.00
4½	1.50	..	.....

ECCENTRIC TEES

ECCENTRIC ON RUN

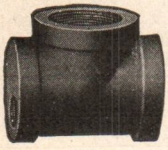


Fig. 18700C

ECCENTRIC ON OUTLET

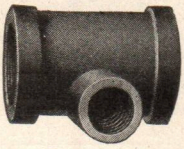


Fig. 18700D

These fittings are designed to prevent the accumulation and lodgment of condensation. Orders must be accompanied with sketch, showing position in which the fittings are to be placed. Prices on application.

BLOW-OFF CROSSES

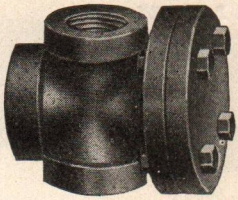


Fig. 18700E

The utility and convenience of this special fitting for feeding and blowing-off boilers will recommend itself.

It is most conveniently placed in the position as shown in the above illustration. The large openings on the run are of same size.

The reduced openings are usually of one size, but can be made to suit requirements. The reduced top inlet is used for feeding the boiler.

To the lower reduced outlet the blow-off valve or cock is connected. The blind flange is removable for cleaning out purposes.

STANDARD

For steam working pressures up to 125 pounds.

Size Inches	Price Each	Size Inches	Price Each
2½x1½	9.00	4x2½	12.00
2½x2	9.00	5x2½	18.00
2½x2½	9.00	5x3	18.00
3 x1½	10.00	6x2½	27.00
3 x2	10.00	6x3	27.00
4 x2	12.00	.....	.....

EXTRA HEAVY

For steam working pressures up to 250 pounds.

Size Inches	Price Each	Size Inches	Price Each
2½x2½	12.00	4x2	16.00
3 x2	13.50	4x2½	16.00

Other sizes extra heavy blow-off crosses made to order. Prices on application.

CAST IRON FITTINGS

EXTRA HEAVY

For 250 Pounds Working Pressure

ELBOW

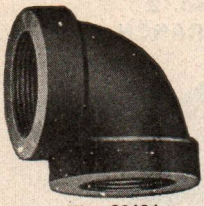


Fig. 8848A

45° ELBOW

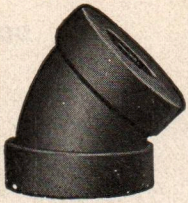


Fig. 8848B

TEE

Fig. 8848C

Size.....inches	½	¾	1	1¼	1½	2	2½	3	3½
Elbows .....each	.25	.30	.35	.45	.60	.75	1.25	2.00	2.75
" Reducing.... "	.35	.40	.45	.55	.75	.95	1.55	2.50	3.40
" 45°..... "	.35	.40	.45	.55	.70	.90	1.50	2.50	3.50
Tees..... "	.40	.45	.55	.70	.90	1.15	1.80	3.00	4.25
" Reducing..... "	.55	.60	.70	.90	1.15	1.40	2.25	3.75	5.30

Size.....inches	4	4½	5	6	7	8	9	10	12
Elbows .....each	3.50	4.25	5.50	8.00	12.00	17.00	25.00	28.00	40.00
" Reducing .... "	4.40	5.30	6.80	10.00	15.00	21.00	31.00	35.00	50.00
" 45° ..... "	4.50	5.50	6.75	9.75	14.50	21.00	31.00	34.00	48.00
Tees..... "	5.50	6.75	8.25	12.00	18.00	25.00	35.00	42.00	60.00
" Reducing..... "	6.85	8.50	10.25	15.00	22.50	31.00	44.00	52.00	75.00

CROSS

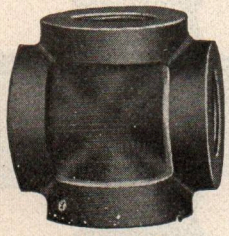


Fig. 8848D

"Y" BRANCH

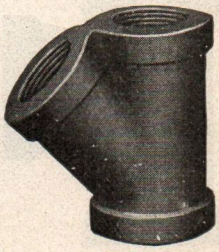


Fig. 8848E

Size.....inches	½	¾	1	1¼	1½	2	2½	3	3½
Crosses..... each	.60	.65	.70	.90	1.20	1.50	2.50	4.00	5.50
" Reducing.... "	.80	.85	.90	1.15	1.50	1.85	3.15	5.00	6.85
"Y" Branches..... "	....	....	1.10	1.35	1.80	2.25	3.75	6.00	8.25
" " Reducing "	....	....	1.38	1.75	2.25	2.88	4.50	7.50	10.63

Size.....inches	4	4½	5	6	7	8	9	10	12
Crosses..... each	7.00	8.50	11.00	16.00	24.00	34.00	48.00	56.00	80.00
" Reducing.... "	8.75	10.00	13.75	20.00	30.00	42.00	60.00	70.00	100.00
"Y" Branches..... "	11.00	13.50	16.50	24.00	36.00	50.00	72.00	84.00	120.00
" " Reduciug "	13.75	16.88	20.63	30.00	45.00	62.50	90.00	105.00	150.00

Galvanized extra heavy fittings, double above list.

CAST IRON LONG TURN FITTINGS

For steam working pressures up to 125 pounds

For water working pressures up to 150 pounds

No. 1
WATER ELBOW

Fig. 722A

Size Inches	Price Each Black	Price Each Galv.	Size Inches	Price Each Black	Price Each Galv.
1	.32	.64	4½	5.50	11.00
1¼	.40	.80	5	6.50	13.00
1½	.55	1.10	6	8.75	17.50
2	.80	1.60	7	13.00	26.00
2½	1.20	2.40	8	17.00	34.00
3	2.25	4.50	9	25.50	51.00
3½	3.25	6.50	10	30.00	60.00
4	3.50	7.00	12	40.00	80.00

No. 2
DOUBLE BRANCH ELBOW

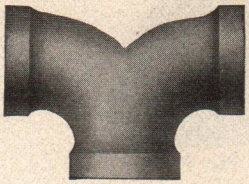


Fig. 722C

Size Inches	Price Each Black	Price Each Galv.	Size Inches	Price Each Black	Price Each Galv.
1	.64	1.28	4½	11.00	22.00
1¼	.80	1.60	5	13.00	26.00
1½	1.10	2.20	6	17.50	35.00
2	1.60	3.20	7	26.00	52.00
2½	2.40	4.80	8	34.00	68.00
3	4.50	9.00	9	51.00	102.00
3½	6.50	13.00	10	60.00	120.00
4	7.00	14.00	12	80.00	160.00

No. 3
SWEEP TEES

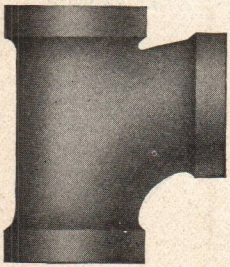


Fig. 722B

Size Inches	Price Each Black	Price Each Galv.	Size Inches	Price Each Black	Price Each Galv.
1	.48	.96	4½	8.25	16.50
1¼	.60	1.20	5	9.75	19.50
1½	.82	1.64	6	13.25	26.50
2	1.20	2.40	7	19.50	39.00
2½	1.80	3.60	8	25.50	51.00
3	3.40	6.80	9	38.00	76.00
3½	4.90	9.80	10	45.00	90.00
4	5.25	10.50	12	60.00	120.00

Reducing sizes, bushed in the sand, can be furnished from the factory. For list prices, add 50 per cent to those given on this page.

No. 4
SWEEP CROSSES

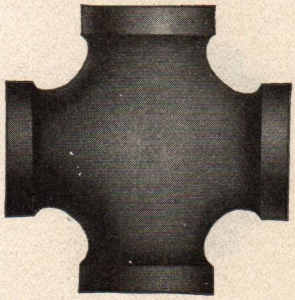


Fig. 722D

Size Inches	Price Each Black	Price Each Galv.	Size Inches	Price Each Black	Price Each Galv.
1	.85	1.70	4½	15.00	30.00
1¼	1.10	2.20	5	17.50	35.00
1½	1.50	3.00	6	24.00	48.00
2	2.15	4.30	7	35.00	70.00
2½	3.20	6.40	8	45.00	90.00
3	6.00	12.00	9	68.00	136.00
3½	8.75	17.50	10	80.00	160.00
4	9.50	19.00	12	107.00	214.00

A complete list of reducing fittings will be furnished on application.

CAST IRON LONG TURN FITTINGS

For steam working pressures up to 125 pounds
For water working pressures up to 150 pounds

ELBOWS

FLANGED ONE END

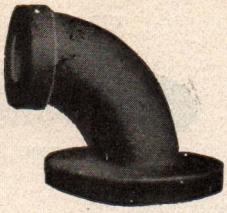


Fig. 723A

Size Inches	Price, Each Flange One End	Price, Each Flange Two Ends
2	5.00	6.00
2½	5.50	6.75
3	6.00	7.50
3½	6.50	8.50
4	7.50	10.00
5	10.00	12.50
6	14.00	17.50
7	25.00	30.00
8	30.00	35.00
10	40.00	50.00
12	53.00	65.00

ELBOWS WITH BASE

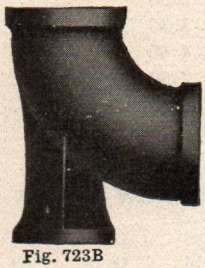


Fig. 723B

Size Inches	Price Each	Size Inches	Price Each
3	8.00	7	25.00
4	11.00	8	32.00
4½	14.00	9	40.00
5	15.00	10	50.00
6	18.00	12	65.00

TEES WITH BASE

Made to order only.

Prices on these long turn fittings include the facing and drilling of flanges.

TEES

FLANGED TWO ENDS

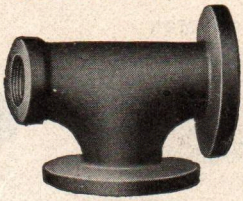


Fig. 723C

Size Inches	Price, Each Flange 1 or 2 Ends	Price, Each Flange 3 Ends	Size Inches	Price, Each Flange 1 or 2 Ends	Price, Each Flange 3 Ends
2	8.00	9.00	6	22.00	26.00
2½	9.00	10.00	7	40.00	45.00
3	10.00	11.50	8	45.00	50.00
3½	11.00	13.00	10	80.00	90.00
4	12.00	15.00	12	105.00	120.00
5	15.00	18.00	..	.....	.....

CROSSES

Size Inches	Price, Each Flange 1 or 2 Ends	Price, Each Flange 3 or 4 Ends	Size Inches	Price, Each Flange 1 or 2 Ends	Price, Each Flange 3 or 4 Ends
2	11.00	12.00	6	30.00	35.00
2½	12.50	13.50	7	55.00	60.00
3	13.50	15.00	8	65.00	70.00
3½	15.00	17.00	10	100.00	120.00
4	17.00	20.00	12	132.00	157.00
5	22.00	25.00	..	.....	.....

In ordering, specify which ends are to be flanged or send sketch.

STRAIGHT BACK TEES

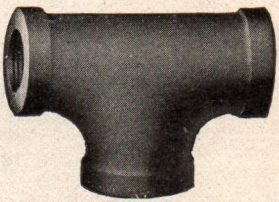


Fig. 723D

Size Inches	Price, Each Strt.	Price, Each Reducing	Size Inches	Price, Each Strt.	Price, Each Reducing
1	.64	.96	4½	11.00	16.50
1¼	.80	1.20	5	13.00	19.50
1½	1.10	1.65	6	17.50	26.25
2	1.60	2.40	7	26.00	39.00
2½	2.40	3.60	8	34.00	51.00
3	4.50	6.75	9	51.00	76.50
3½	6.50	9.75	10	60.00	90.00
4	7.00	10.50	12	80.00	120.00

CAST IRON FITTINGS

FLANGES

COMMON

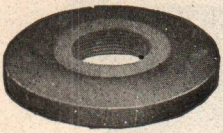


Fig. 3706A

FLOOR

Fig. 3706B

CIRCULAR

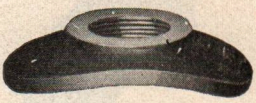


Fig. 3706C

COMMON, NOT FACED

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
¾x4	.22	3 x 7	.62	5x12	2.20	8x15	4.00
¾x5	.30	3 x 7½	.75	5x12½	2.20	8x16	5.00
1 x5	.30	3 x 8	.90	6x10	1.50	9x15	4.00
1 x6	.42	3 x 9	1.15	6x11	1.75	9x16	5.00
1¼x4½	.25	3½x 8	.90	6x12	2.20	9x17	5.75
1¼x5	.30	3½x 8½	1.00	6x12½	2.20	10x16	5.00
1¼x6	.40	3½x 9	1.15	6x13	2.80	10x17	5.75
1½x5	.30	3½x10	1.50	6x13½	2.80	10x18	7.00
1½x6	.40	4 x 8	.90	6x14	3.25	10x19	7.50
2 x6	.42	4 x 8½	1.00	7x12	2.20	12x18	7.00
2 x6½	.50	4 x 9	1.15	7x12½	2.20	12x19	7.50
2 x7	.62	4 x10	1.50	7x13	2.80	12x20	8.50
2 x8	.90	4½x 9	1.15	7x13½	2.80	14x20	8.50
2½x6	.42	4½x 9¼	1.25	7x14	3.25	14x21	9.50
2½x6½	.50	4½x10	1.50	7x15	4.00	15x21	9.50
2½x7	.62	4½x11	1.75	8x13	2.80	15x22¼	14.00
2½x8	.90	5 x10	1.50	8x13½	2.80	16x23½	18.00
3 x6½	.50	5 x11	1.75	8x14	3.25	.....	.....

FLOOR, NOT FACED, COUNTERSUNK SCREW HOLES

Size.....inches	⅜x3	½x3½	¾x3½	1x4	1¼x4	1½x4½	2x5½
Price.....each	.10	.15	.15	.16	.16	.22	.35

All floor flanges are drilled for screw. Galvanized take double the list.

CIRCULAR

Pipe.....inches	1½	2	2½	3	4	5	6	7	8	9	10	12
Diameter Flange... "	6	7	8	9	9	11	12	13	14	17	18	20

These flanges being made to order, it is always necessary to give the circle they are to fit.

STANDARD FLANGED FITTINGS

For 125 Pounds Steam Working Pressure

ELBOWS

90°

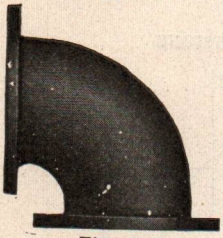
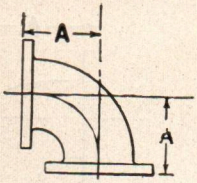


Fig. 24A

DIMENSIONS



45°

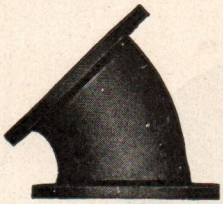
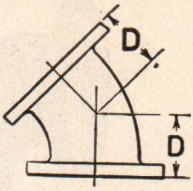


Fig. 24B

DIMENSIONS



New Standard—Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

Size Inches	Diameter of Flanges Inches	Center to Face Inches		Price, Each			
				90°		45°	
		"A" 90°	"D" 45°	With Faced Flanges	With Faced and Drilled Flanges	With Faced Flanges	With Faced and Drilled Flanges
1¼	4½	3¾	2	3.00	3.60	3.30	3.90
1½	5	4	2¼	3.00	3.60	3.30	3.90
2	6	4½	2½	3.00	3.60	3.30	3.90
2½	7	5	3	3.15	3.75	3.50	4.10
3	7½	5½	3	3.45	4.15	3.80	4.50
3½	8½	6	3½	4.05	4.90	4.50	5.35
4	9	6½	4	4.50	5.50	5.00	6.00
4½	9¼	7	4	5.50	6.50	6.00	7.00
5	10	7½	4½	6.25	7.25	6.90	7.90
6	11	8	5	7.60	8.90	8.35	9.65
7	12½	8½	5½	10.50	12.00	11.00	12.50
8	13½	9	5½	12.00	13.60	12.60	14.20
9	15	10	6	17.00	19.25	17.75	20.00
10	16	11	6½	19.00	21.70	20.00	22.70
12	19	12	7½	28.00	31.00	29.50	32.50
14	21	14	7½	41.50	45.25	41.50	45.25
15	22¼	14½	8	47.00	51.50	47.00	51.50
16	23½	15	8	54.50	59.50	54.50	59.50
18	25	16½	8½	71.00	77.00	71.00	77.00
20	27½	18	9½	90.00	97.00	90.00	97.00
22	29½	20	10	113.00	122.00	113.00	122.00
24	32	22	11	140.00	150.00	140.00	150.00

Furnished faced only, unless otherwise ordered.

Larger sizes made to order. Prices on application.

STANDARD FLANGED FITTINGS

For 125 Pounds Steam Working Pressure

REDUCING TAPER ELBOWS

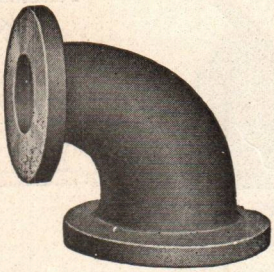
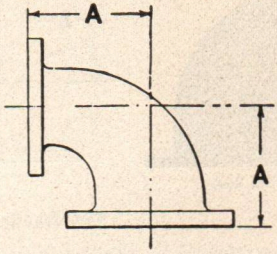


Fig. 725A

DIMENSIONS



New Standard—Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

Size Inches	Diameter of Flanges Inches	Center to Face "A" Inches	Price, Each		Size Inches	Diameter of Flanges Inches	Center to Face "A" Inches	Price, Each	
			With Faced Flanges	With Faced and Drilled Flanges				With Faced Flanges	With Faced and Drilled Flanges
3 x1½	7½x 5	5½	6.90	7.60	8x 6	13½x11	9	24.00	25.60
3 x2	7½x 6	5½	6.90	7.60	8x 7	13½x12½	9	24.00	25.60
3 x2½	7½x 7	5½	6.90	7.60	9x 6	15 x11	10	34.00	36.25
3½x2	8½x 6	6	8.10	8.95	9x 8	15 x13½	10	34.00	36.25
3½x2½	8½x 7	6	8.10	8.95	10x 4½	16 x 9¼	11	38.00	40.70
3½x3	8½x 7½	6	8.10	8.95	10x 5	16 x10	11	38.00	40.70
4 x2	9 x 6	6½	9.00	10.00	10x 6	16 x11	11	38.00	40.70
4 x2½	9 x 7	6½	9.00	10.00	10x 7	16 x12½	11	38.00	40.70
4 x3	9 x 7½	6½	9.00	10.00	10x 8	16 x13½	11	38.00	40.70
4 x3½	9 x 8½	6½	9.00	10.00	10x 9	16 x15	11	38.00	40.70
4½x2½	9¼x 7	7	11.00	12.00	12x 6	19 x11	12	56.00	59.00
4½x3½	9¼x 8½	7	11.00	12.00	12x 7	19 x12½	12	56.00	59.00
4½x4	9¼x 9	7	11.00	12.00	12x 8	19 x13½	12	56.00	59.00
5 x2½	10 x 7	7½	12.50	13.50	12x10	19 x16	12	56.00	59.00
5 x3	10 x 7½	7½	12.50	13.50	14x10	21 x16	14	70.00	73.75
5 x4	10 x 9	7½	12.50	13.50	14x12	21 x19	14	70.00	73.75
6 x2½	11 x 7	8	15.25	16.55	15x10	22¼x16	14½	80.00	84.50
6 x3	11 x 7½	8	15.25	16.55	15x12	22¼x19	14½	80.00	84.50
6 x3½	11 x 8½	8	15.25	16.55	16x12	23½x19	15	90.00	95.00
6 x4	11 x 9	8	15.25	16.55	16x14	23½x21	15	90.00	95.00
6 x5	11 x10	8	15.25	16.55	16x15	23½x22¼	15	90.00	95.00
7 x5	12½x10	8½	21.00	22.50	18x15	25 x22¼	16½	105.00	111.00
7 x6	12½x11	8½	21.00	22.50	18x16	25 x23½	16½	105.00	111.00
8 x3½	13½x 8½	9	24.00	25.60	20x14	27½x21	18	120.00	127.00
8 x4	13½x 9	9	24.00	25.60	20x16	27½x23½	18	120.00	127.00
8 x5	13½x10	9	24.00	25.60	20x18	27½x25	18	120.00	127.00

Elbows not listed above, made to order at special price. Flanged fittings will be furnished faced only, unless otherwise ordered.

STANDARD FLANGED FITTINGS

For Steam Working Pressures up to 125 Pounds

TEES

STRAIGHT

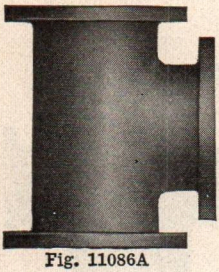
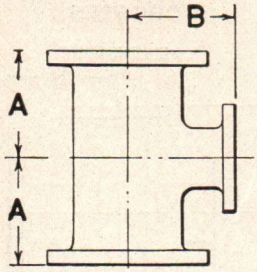


Fig. 11086A

DIMENSIONS



REDUCING

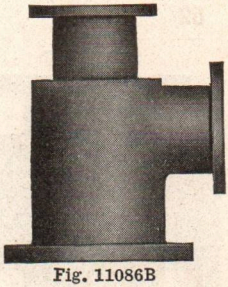


Fig. 11086B

New Standard—Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

Size Inches	Diameter of Flanges Inches	*Face to Face "AA" Inches	Center to Face Inches		Price, Each			
					Straight		†Reducing	
			*"A"	*"B"	With Faced Flanges	With Faced and Drilled Flanges	With Faced Flanges	With Faced and Drilled Flanges
1¼	4½	7½	3¾	3¾	4.35	5.25	.....	.....
1½	5	8	4	4	4.35	5.25	5.00	5.90
2	6	9	4½	4½	4.35	5.25	5.00	5.90
2½	7	10	5	5	4.55	5.45	5.25	6.15
3	7½	11	5½	5½	5.00	6.10	5.75	6.85
3½	8½	12	6	6	5.85	7.10	6.75	8.00
4	9	13	6½	6½	6.50	8.00	7.50	9.00
4½	9¼	14	7	7	8.00	9.50	9.25	10.75
5	10	15	7½	7½	9.10	10.60	10.50	12.00
6	11	16	8	8	11.00	12.95	12.65	14.60
7	12½	17	8½	8½	15.25	17.50	17.50	19.75
8	13½	18	9	9	17.40	19.80	20.00	22.40
9	15	20	10	10	24.65	28.00	28.50	31.85
10	16	22	11	11	27.50	31.50	31.50	35.50
12	19	24	12	12	40.50	45.00	46.50	51.00
14	21	28	14	14	60.00	65.50	69.00	74.50
15	22¼	29	14½	14½	68.00	74.75	78.00	84.75
16	23½	30	15	15	79.00	86.50	91.00	98.50
18	25	33	16½	16½	103.00	112.00	118.00	127.00
20	27½	36	18	18	130.00	140.00	150.00	160.00
22	29½	40	20	20	164.00	177.00	189.00	202.00
24	32	44	22	22	203.00	218.00	233.00	248.00

*All reducing tees, 16 inches and smaller, take the same center to face dimensions as straight size tees. All tees reducing on the run only, take the same dimensions, center to face, as the largest straight size. Tees, sizes 18 inches and larger, reducing on the outlet, are made in two lengths, depending on the size of outlet. For number of page of these dimensions, see index. Furnished faced only, unless otherwise specified. Larger sizes made to order.

Prices upon application.

Bullheads or tees having outlet larger than the run, will be the same length center to face of all openings as a tee with all openings of the size of the outlet. For example, a 12x12x16-inch tee will be governed by the dimensions of the 16-inch long body tee (upper table), namely, 15 inches center to face of all openings and 30 inches face to face.

†Reducing in run or branch.

STANDARD FLANGED FITTINGS

For Steam Working Pressures up to 125 Pounds

CROSSES

STRAIGHT

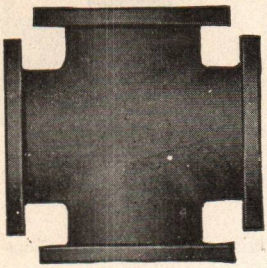
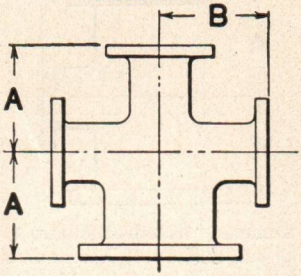


Fig. 28A

DIMENSIONS



REDUCING

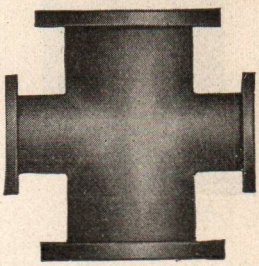


Fig. 28B

New Standard—Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

Size Inches	Diameter of Flanges Inches	*Face to Face "AA" Inches	Center to Face Inches		Price, Each			
					Straight		Reducing	
			*"A"	*"B"	With Faced Flanges	With Faced and Drilled Flanges	With Faced Flanges	With Faced and Drilled Flanges
1¼	4½	7½	3¾	3¾	6.75	7.95	.....	.....
1½	5	8	4	4	6.75	7.95	.....	.....
2	6	9	4½	4½	6.75	7.95	7.75	8.95
2½	7	10	5	5	6.95	8.15	8.00	9.20
3	7½	11	5½	5½	7.65	9.05	8.75	10.15
3½	8½	12	6	6	9.00	10.70	10.35	12.05
4	9	13	6½	6½	10.00	12.00	11.50	13.50
4½	9¼	14	7	7	12.00	14.00	13.75	15.75
5	10	15	7½	7½	13.75	15.75	15.75	17.75
6	11	16	8	8	16.75	19.25	19.25	21.75
7	12½	17	8½	8½	23.00	26.00	26.50	29.50
8	13½	18	9	9	26.50	29.75	30.50	33.75
9	15	20	10	10	37.50	42.00	43.00	47.50
10	16	22	11	11	42.00	47.50	48.00	53.50
12	19	24	12	12	61.50	67.50	71.00	77.00
14	21	28	14	14	91.00	98.50	105.00	112.50
15	22¼	29	14½	14½	103.00	112.00	118.00	127.00
16	23½	30	15	15	120.00	130.00	138.00	148.00
18	25	33	16½	16½	157.00	169.00	180.00	192.00
20	27½	36	18	18	198.00	212.00	228.00	242.00
22	29½	40	20	20	248.00	266.00	285.00	303.00
24	32	44	22	22	310.00	330.00	355.00	375.00

*All reducing crosses, 16 inches and smaller, take the same center to face dimensions as straight size crosses. All crosses reducing on the run only, take the same dimensions, center to face, as the largest straight size. Crosses, sizes 18 inches, and larger, reducing on the outlet, are made in two lengths, depending on the size of outlet.

Furnished faced only, unless otherwise ordered. Larger sizes made to order. Prices on application.

STANDARD FLANGED FITTINGS

For Steam Working Pressures up to 125 Pounds

Y BRANCHES OR LATERALS

STRAIGHT

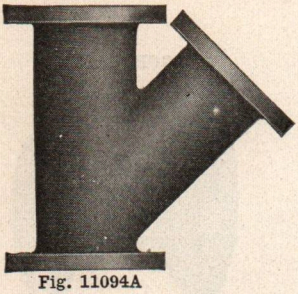
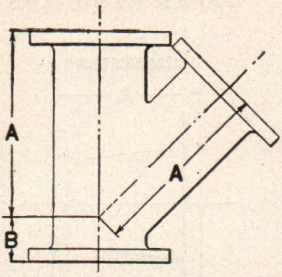


Fig. 11094A

DIMENSIONS



REDUCING

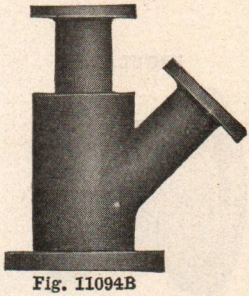


Fig. 11094B

New Standard--Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

Size Inches	Diameter of Flanges Inches	*Face to Face of Run Inches	*Center to Face of Run or Outlet A Inches	Price, Each			
				Straight		†Reducing	
				With Faced Flanges	With Faced and Drilled Flanges	With Faced Flanges	With Faced and Drilled Flanges
1¼	4½	8	6¼	6.75	7.95	.....	.....
1½	5	9	7	6.75	7.95	.....	.....
2	6	10½	8	6.75	7.95	7.75	8.95
2½	7	12	9½	6.95	8.15	8.00	9.20
3	7½	13	10	7.65	9.05	8.75	10.15
3½	8½	14½	11½	9.00	10.70	10.35	12.05
4	9	15	12	10.00	12.00	11.50	13.50
4½	9¼	15½	12½	12.00	14.00	13.75	15.75
5	10	17	13½	13.75	15.75	15.75	17.75
6	11	18	14½	16.75	19.25	19.25	21.75
7	12½	20½	16½	23.00	26.00	26.50	29.50
8	13½	22	17½	26.50	29.75	30.50	33.75
9	15	24	19½	37.50	42.00	43.00	47.50
10	16	25½	20½	42.00	47.50	48.00	53.50
12	19	30	24½	61.50	67.50	71.00	77.00
14	21	33	27	91.00	98.50	105.00	112.50
15	22¼	34½	28½	103.00	112.00	118.00	127.00
16	23½	36½	30	120.00	130.00	138.00	148.00
18	25	39	32	157.00	169.00	180.00	192.00
20	27½	43	35	198.00	212.00	228.00	242.00
22	29½	46	37½	248.00	266.00	285.00	303.00
24	32	49½	40½	310.00	330.00	355.00	375.00

All reducing Y or laterals, 16 inches and smaller, take the same center to face dimensions as the straight size fitting.

*All laterals reducing on run only carry the same dimensions face to face as straight size laterals. Sizes 18 inches and up, reducing on the branch, are made in two lengths, depending on the size of the branch. For page number of these dimensions, see index.

†Reducing in run or branch.

Flanged fittings will always be furnished faced only, unless otherwise ordered. Larger sizes made to order. Prices on application.

STANDARD FLANGED FITTINGS

For 125 Pounds Steam Working Pressure

TAPER REDUCERS

REGULAR

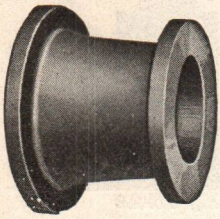
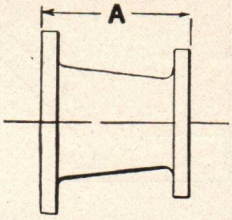


Fig. 92A

DIMENSIONS



REGULAR REDUCERS

ECCENTRIC

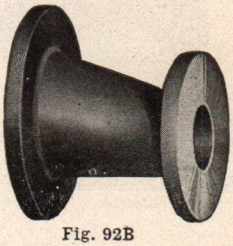


Fig. 92B

New Standard—Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

Size Inches	Diameter of Flanges Inches	Face to Face "A" Inches	Price, Each		Size Inches	Diameter of Flanges Inches	Face to Face "A" Inches	Price, Each	
			With Faced Flanges	With Faced and Drilled Flanges				With Faced Flanges	With Faced and Drilled Flanges
3 x2	7½x 6	6	6.90	7.60	10x 4	16 x 9	12	38.00	40.70
3½x2½	8½x 7	6½	8.10	8.95	10x 5	16 x10	12	38.00	40.70
4 x2	9 x 6	7	9.00	10.00	10x 6	16 x11	12	38.00	40.70
4 x2½	9 x 7	7	9.00	10.00	10x 8	16 x13½	12	38.00	40.70
4 x3	9 x 7½	7	9.00	10.00	12x 5	19 x10	14	56.00	59.00
5 x2	10 x 6	8	12.50	13.50	12x 6	19 x11	14	56.00	59.00
5 x2½	10 x 7	8	12.50	13.50	12x 8	19 x13½	14	56.00	59.00
5 x3	10 x 7½	8	12.50	13.50	12x10	19 x16	14	56.00	59.00
5 x4	10 x 9	8	12.50	13.50	14x 6	21 x11	16	70.00	73.75
6 x3	11 x 7½	9	15.25	16.55	14x 8	21 x13½	16	70.00	73.75
6 x3½	11 x 8½	9	15.25	16.55	14x10	21 x16	16	70.00	73.75
6 x4	11 x 9	9	15.25	16.55	14x12	21 x19	16	70.00	73.75
6 x5	11 x10	9	15.25	16.55	15x 8	22¼x13½	17	80.00	84.50
7 x3	12½x 7½	10	21.00	22.50	15x10	22¼x16	17	80.00	84.50
7 x4	12½x 9	10	21.00	22.50	15x12	22¼x19	17	80.00	84.50
7 x5	12½x10	10	21.00	22.50	15x14	22¼x21	17	80.00	84.50
7 x6	12½x11	10	21.00	22.50	16x 8	23½x13½	18	90.00	95.00
8 x3	13½x 7½	11	24.00	25.60	16x10	23½x16	18	90.00	95.00
8 x4	13½x 9	11	24.00	25.60	16x12	23½x19	18	90.00	95.00
8 x5	13½x10	11	24.00	25.60	16x14	23½x21	18	90.00	95.00
8 x6	13½x11	11	24.00	25.60	....	.....	....	....	....

Flanged taper reducers as above or of any other dimensions, will be made to order.

Flanged eccentric taper reducers, prices on application.

TEMPLATES FOR DRILLING STANDARD AND LOW PRESSURE FLANGED VALVES AND FITTINGS

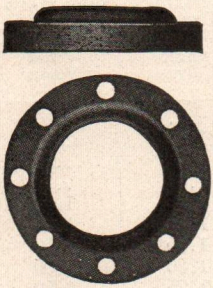


Fig. 8681A

SIZES 1-INCH TO 48-INCH, INCLUSIVE

These drilling templates are in multiples of four, so that fittings may be made to face in any quarter, and bolt holes straddle the center line. They can be drilled to any other template, if so desired.

Bolt holes are drilled 1/8 inch larger than nominal diameter of bolts, except that brass valves and fittings, 6-inch and smaller, have holes 1/16 inch larger than the bolts.

New Standard—Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

Size Inches	Diameter of Flanges Inches	Thickness of Flanges Inches	Bolt Circle Inches	Number of Bolts	Size of Bolts Inches	Bolt Lengths Inches
3/4	3 1/2	7/16	2 1/2	4	3/8	1 1/2
1	4	7/16	3	4	7/16	1 1/2
1 1/4	4 1/2	1/2	3 3/8	4	7/16	1 1/2
1 1/2	5	9/16	3 7/8	4	1/2	1 3/4
2	6	5/8	4 3/4	4	5/8	2
2 1/2	7	11/16	5 1/2	4	5/8	2 1/4
3	7 1/2	3/4	6	4	5/8	2 1/2
3 1/2	8 1/2	13/16	7	4	5/8	2 1/2
4	9	15/16	7 1/2	8	5/8	2 3/4
4 1/2	9 1/4	15/16	7 3/4	8	3/4	3
5	10	15/16	8 1/2	8	3/4	3
6	11	1	9 1/2	8	3/4	3
7	12 1/2	1 1/16	10 3/4	8	3/4	3
8	13 1/2	1 1/8	11 3/4	8	3/4	3 1/4
9	15	1 1/8	13 1/4	12	3/4	3 1/4
10	16	1 3/16	14 1/4	12	7/8	3 1/2
12	19	1 1/4	17	12	7/8	3 3/4
14	21	1 3/8	18 3/4	12	1	4 1/4
15	22 1/4	1 3/8	20	16	1	4 1/4
16	23 1/2	1 7/16	21 1/4	16	1	4 1/4
18	25	1 9/16	22 3/4	16	1 1/8	4 3/4
20	27 1/2	1 11/16	25	20	1 1/8	5
22	29 1/2	1 13/16	27 1/4	20	1 1/4	5 1/2
24	32	1 7/8	29 1/2	20	1 1/4	5 1/2
26	34 1/4	2	31 3/4	24	1 1/4	5 3/4
28	36 1/2	2 1/16	34	28	1 1/4	6
30	38 3/4	2 1/8	36	28	1 3/8	6 1/4
32	41 3/4	2 1/4	38 1/2	28	1 1/2	6 1/2
34	43 3/4	2 5/16	40 1/2	32	1 1/2	6 1/2
36	46	2 3/8	42 3/4	32	1 1/2	7
38	48 3/4	2 3/8	45 1/4	32	1 5/8	7
40	50 3/4	2 1/2	47 1/4	36	1 5/8	7
42	53	2 5/8	49 1/2	36	1 5/8	7 1/2
44	55 1/4	2 5/8	51 3/4	40	1 5/8	7 1/2
46	57 1/4	2 11/16	53 3/4	40	1 5/8	7 1/2
48	59 1/2	2 3/4	56	44	1 5/8	8

PRICE LIST FOR DRILLING

STANDARD, LOW PRESSURE, MEDIUM AND EXTRA HEAVY FLANGED VALVES AND FITTINGS

Size Inches	Price, Each, for Drilling Standard and Low Pressure Valves			Price, Each, for Drilling Medium and Extra Heavy Valves		
	With Two Flanges Except Angle Valves	Angle Valves	Cross Valves and Cross Safety Valves	With Two Flanges Except Angle Valves	Angle Valves	Cross Valves
¾	.60	1.00	1.20	....	....	....
1	.60	1.00	1.20	.60	1.00	....
1¼	.60	1.00	1.20	.60	1.00	....
1½	.60	1.00	1.20	.60	1.00	....
2	.75	1.25	1.50	.75	1.25	1.50
2½	.75	1.25	1.50	.75	1.25	1.50
3	.75	1.25	1.50	.75	1.25	1.50
3½	1.00	1.50	2.00	1.00	1.50	2.00
4	1.25	1.75	2.50	1.25	1.75	2.50
4½	1.50	2.00	3.00	1.50	2.00	3.00
5	1.50	2.00	3.00	1.50	2.00	3.00
6	1.75	2.50	3.50	1.75	2.50	3.50
7	2.25	3.00	4.50	2.25	3.00	4.50
8	2.25	3.00	4.50	2.25	3.00	4.50
9	2.50	3.50	5.00	2.50	3.50	5.00
10	2.50	3.50	5.00	2.50	3.50	5.00
12	3.50	5.00	7.00	3.50	5.00	7.00
14	4.00	6.00	....	4.00	6.00	8.00
15	4.50	6.50	....	4.00	6.00	8.00
16	5.00	7.00	....	5.00	7.00	....
18	6.00	10.00	....	6.00	....	....
20	7.50	12.00	....	7.50	....	....
22	9.00	14.00	....	9.00	....	....
24	10.00	16.00	....	10.00	....	....
26	11.00	18.00	....	....	....	....
28	12.00	20.00	....	....	....	....
30	12.00	22.00	....	12.00	....	....
32	12.00	22.00	....	....	....	....
34	14.00	24.00	....	....	....	....
36	14.00	24.00	....	....	....	....
42	25.00	....	....	....	....	....
48	30.00	....	....	....	....	....

EXTRA NET PRICES FOR ATTACHING COMPANION FLANGES TO STANDARD FLANGED FITTINGS AND VALVES

Size Inches	Price, Each		Size Inches	Price, Each	
	For Bolting Companion Flanges to Fittings Single Flange	Wooden Protectors Bolted on with Two Bolts		For Bolting Companion Flanges to Fittings Single Flange	Wooden Protectors Bolted on with Two Bolts
1¼	.10	.20	6	.15	.25
1½	.10	.20	7	.15	.30
2	.10	.20	8	.15	.30
2½	.10	.20	9	.20	.30
3	.10	.25	10	.20	.35
3½	.10	.25	12	.20	.35
4	.10	.25	14	.20	.40
4½	.15	.25	15	.25	.40
5	.15	.25	16	.25	.45

Bolts and gaskets not included in above prices. Spot facing bolt holes, 5 cents net extra, for each hole.

STANDARD COMPANION FLANGES

For 125 Pounds Steam Working Pressure

BACK VIEW, SHOWING HUB

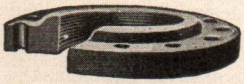


Fig. 30A

SMOOTH FACE

Fig. 30B

BLIND FLANGE
16-INCH AND SMALLER

Fig. 30C

American Standard—Effective April 1, 1914

Size Inches	Cast Iron Price, Each Faced	Cast Iron Price, Each Faced and Drilled	Malleable Iron Price, Each Faced	Malleable Iron Price, Each Faced and Drilled	Ferrosteel Price, Each Faced	Ferrosteel Price, Each Faced and Drilled	Forged Steel Price, Each Faced	Forged Steel Price, Each Faced and Drilled	Blind Flanges Price, Each Faced	Blind Flanges Price, Each Faced and Drilled
1 x 4	.55	.80	1.10	1.60	.70	1.00	.....	.....	....	....
1¼x 4½	.60	.85	1.20	1.70	.75	1.05	.....	.....	....	....
1½x 5	.65	.90	1.30	1.80	.80	1.10	.....	.....	....	....
2 x 6	.75	1.00	1.50	2.00	.95	1.25	10.40	11.00	1.15	1.40
2½x 7	.85	1.10	1.70	2.20	1.05	1.35	11.80	13.00	1.30	1.55
3 x 7½	.95	1.25	1.90	2.50	1.20	1.55	13.70	15.00	1.40	1.70
3½x 8½	1.20	1.55	2.40	3.10	1.50	1.95	17.60	19.00	1.80	2.15
4 x 9	1.35	1.80	2.70	3.60	1.70	2.25	18.30	20.00	2.00	2.45
4½x 9¼	1.45	1.90	2.90	3.80	1.80	2.35	20.30	22.00	2.20	2.65
5 x10	1.60	2.05	3.20	4.10	2.00	2.55	22.30	24.00	2.40	2.85
6 x11	2.00	2.50	4.00	5.00	2.50	3.10	25.40	27.00	3.00	3.50
7 x12½	2.65	3.25	5.30	6.50	3.30	4.05	27.20	32.00	4.00	4.60
8 x13½	3.10	3.80	6.20	7.60	3.90	4.75	32.00	35.00	4.60	5.30
9 x15	3.85	4.65	7.70	9.30	4.80	5.80	37.00	40.00	5.75	6.55
10 x16	4.50	5.50	9.00	11.00	5.65	6.85	45.00	48.00	6.75	7.75
12 x19	6.50	7.65	13.00	15.30	8.15	9.55	56.00	60.00	9.75	10.90
14 x21	9.00	10.35	18.00	20.70	11.25	13.00	75.50	80.00	13.50	14.85
15 x21	11.50	13.20	23.00	26.40	14.50	16.50	.....	.....	.....	.....
15 x22¼	11.50	13.20	23.00	26.40	14.50	16.50	.....	.....	17.00	18.70
16 x23½	13.50	15.30	27.00	30.60	17.00	19.00	.....	.....	20.00	21.80
18 x25	16.00	18.00	32.00	36.00	20.00	22.50	.....	.....	24.00	26.00
20 x27½	19.00	21.50	38.00	43.00	24.00	27.00	.....	.....	28.00	30.50
22 x29½	22.00	25.00	44.00	50.00	27.50	31.00	.....	.....	33.00	36.00
24 x32	27.00	30.50	54.00	61.00	34.00	38.00	.....	.....	40.00	43.50

STANDARD REDUCING COMPANION FLANGES

FOR STANDARD FLANGED VALVES AND FITTINGS

For Steam Working Pressures up to 125 Pounds

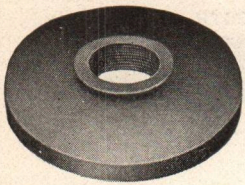


Fig. 9801A

These flanges, used in connection with straight or reducing fittings, enable us to fill orders for reduced sizes more promptly. Customers who desire fittings reduced in this manner will please specify "Reduce by Flanges if Necessary."

They will always be of the same thickness as the regular companion flanges of corresponding outside diameter, and drilled to the template corresponding to the outside diameter, unless otherwise ordered.

In ordering reducing companion flanges, always give the screwed or reduced size first, then the outside diameter of flange wanted; for instance, if a reducing flange is wanted to connect a 6-inch pipe to a 9-inch flanged valve or fitting having a 15-inch O. D. flange, order a 6x15-inch reducing flange. This will clearly avoid the confusion often caused by orders incorrectly calling for a 9x6 or 6x9-inch flange.

New Standard—Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

Size Inches	Price, Each		Size Inches	Price, Each		Size Inches	Price, Each	
	Faced only	Faced and Drilled		Faced only	Faced and Drilled		Faced only	Faced and Drilled
1 x 6	1.30	1.55	4½ x 11	3.30	3.80	8 x 21	15.00	16.35
1¼ x 6	1.30	1.55	5 x 11	3.30	3.80	9 x 21	15.00	16.35
1½ x 6	1.30	1.55	4 x 12½	4.40	5.00	10 x 21	15.00	16.35
1½ x 7	1.45	1.70	4½ x 12½	4.40	5.00	12 x 21	15.00	16.35
2 x 7	1.45	1.70	5 x 12½	4.40	5.00	8 x 22¼	19.00	20.70
1½ x 7½	1.55	1.85	6 x 12½	4.40	5.00	10 x 22¼	19.00	20.70
2 x 7½	1.55	1.85	2 x 13½	5.10	5.80	12 x 22¼	19.00	20.70
2½ x 7½	1.55	1.85	2½ x 13½	5.10	5.80	14 x 22¼	19.00	20.70
2 x 8½	2.00	2.35	3 x 13½	5.10	5.80	10 x 23½	22.00	23.80
2½ x 8½	2.00	2.35	4 x 13½	5.10	5.80	12 x 23½	22.00	23.80
3 x 8½	2.00	2.35	5 x 13½	5.10	5.80	14 x 23½	22.00	23.80
2 x 9	2.20	2.65	6 x 13½	5.10	5.80	15 x 23½	22.00	23.80
2½ x 9	2.20	2.65	7 x 13½	5.10	5.80	12 x 25	26.50	28.50
3 x 9	2.20	2.65	6 x 15	6.35	7.15	14 x 25	26.50	28.50
3½ x 9	2.20	2.65	7 x 15	6.35	7.15	15 x 25	26.50	28.50
2½ x 9¼	2.40	2.85	8 x 15	6.35	7.15	16 x 25	26.50	28.50
3 x 9¼	2.40	2.85	2½ x 16	7.45	8.45	14 x 27½	31.00	33.50
3½ x 9¼	2.40	2.85	3 x 16	7.45	8.45	15 x 27½	31.00	33.50
4 x 9¼	2.40	2.85	3½ x 16	7.45	8.45	16 x 27½	31.00	33.50
2 x 10	2.65	3.10	4 x 16	7.45	8.45	18 x 27½	31.00	33.50
2½ x 10	2.65	3.10	5 x 16	7.45	8.45	15 x 29½	36.00	39.00
3 x 10	2.65	3.10	6 x 16	7.45	8.45	16 x 29½	36.00	39.00
3½ x 10	2.65	3.10	7 x 16	7.45	8.45	18 x 29½	36.00	39.00
4 x 10	2.65	3.10	8 x 16	7.45	8.45	20 x 29½	36.00	39.00
4½ x 10	2.65	3.10	9 x 16	7.45	8.45	14 x 32	44.00	47.50
2 x 11	3.30	3.80	6 x 19	10.75	11.90	16 x 32	44.00	47.50
2½ x 11	3.30	3.80	7 x 19	10.75	11.90	18 x 32	44.00	47.50
3 x 11	3.30	3.80	8 x 19	10.75	11.90	20 x 32	44.00	47.50
3½ x 11	3.30	3.80	9 x 19	10.75	11.90	.....	.....	.....
4 x 11	3.30	3.80	10 x 19	10.75	11.90	.....	.....	.....

Furnished smooth faced and not drilled, unless otherwise specified.

EXTRA HEAVY COMPANION FLANGES

FOR EXTRA HEAVY FLANGED VALVES AND FITTINGS

For Steam Working Pressures up to 250 Pounds

COMPANION FLANGES

BACK VIEW, SHOWING HUB

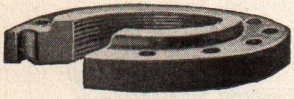


Fig. 6337A

SMOOTH FACE

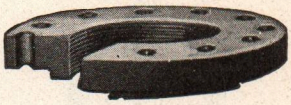


Fig. 6337B

BLIND OR SOLID FLANGE

Fig. 6337C

Unless otherwise specified, we always furnish extra heavy flanges and fittings with 1/16-inch raised face, for which there is no extra charge. This style of facing will hold any gasket, and is especially necessary where a thin corrugated copper gasket is used, as this gasket draws down to 1/32 inch or less and the heavy bolting would (without the raised face) spring the flanges until the edges touch, without putting sufficient pressure in the gasket.

New Standard—Effective January 1, 1915

Recommended by the American Society of Mechanical Engineers, National Association of Master Steam and Hot Water Fitters and Manufacturers' Committee.

COMPANION FLANGES			SOLID FLANGES		
Size Inches	Price, Each		Outside Size Inches	Price, Each	
	Faced	Faced and Drilled		Faced	Faced and Drilled
1 x 4½	.95	1.30	4½	.....	.....
1¼x 5	1.00	1.35	5	.....	.....
1½x 6	1.10	1.45	6	1.65	2.00
2 x 6½	1.25	1.60	6½	1.90	2.25
2½x 7½	1.40	1.75	7½	2.10	2.45
3 x 8¼	1.60	2.05	8¼	2.40	2.85
3½x 9	2.00	2.55	9	3.00	3.55
4 x10	2.25	2.95	10	3.35	4.05
4½x10½	2.40	3.10	10½	3.60	4.30
5 x11	2.65	3.35	11	4.00	4.70
6 x12½	3.30	4.05	12½	5.00	5.75
7 x14	4.40	5.30	14	6.60	7.50
8 x15	5.10	6.15	15	7.65	8.70
9 x16¼	6.30	7.50	16¼	9.50	10.70
10 x17½	7.40	8.90	17½	11.00	12.50
12 x20½	10.75	12.50	20½	16.00	17.75
14 x23	15.00	17.00	23	22.50	24.50
15 x24½	19.00	21.50	24½	28.50	31.00
16 x25½	22.25	25.00	25½	33.50	36.25
18 x28	26.00	29.00	28	39.00	42.00
20 x30½	31.00	35.00	30½	46.00	50.00
22 x33	36.00	41.00	33	54.00	59.00
24 x36	45.00	50.00	36	67.00	72.00

Furnished plain faced, unless otherwise ordered.

PIPE HANGERS, CLAMPS, ETC.

STEEL BAND RING AND BOLT

Fig. 15796A

ADJUSTABLE BEAM CLAMP No. 242

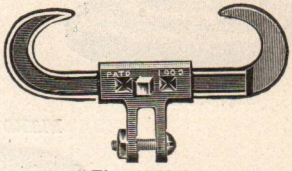


Fig. 15796B

STEEL BAND RINGS AND BOLTS

Size ..... inches	½	¾	1	1¼	1½	2	2½	3
Price ..... each	.08	.08	.09	.10	.12	.14	.16	.19
Size ..... inches	3½	4	4½	5	6	7	8	....
Price ..... each	.21	.25	.30	.35	.45	.55	.65	....

For galvanized, add 50 per cent to list prices.

ADJUSTABLE BEAM CLAMPS

Designed especially for use with any band hanger, by adding socket. Will fit 3 to 7-inch beams.

Price, No. 242, Light	each	.40
" " 243, Extra Heavy	"	.60

EXTENSION BAR

Fig. 15796C

LAG SCREW WITH BOLT

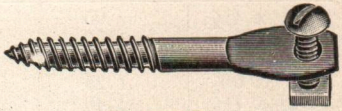


Fig. 15796D

EXTENSION BARS

For use in connection with pipe hangers. Made of best quality soft steel, with holes ⅝ inch apart, furnished in 10-foot lengths; it can be easily cut with a cold chisel, making any desired drop.

Number	0	1	2	3	4
For Pipe ..... inches	½ to ¾	1 to 2	2½ to 3½	4 to 5	6 to 7
Size of Holes ..... "	¼	¼	¼	5/16	5/16
Price ..... per foot	.07	.08	.09	.12	.20

For galvanized, add 50 per cent to list prices.

LAG SCREWS WITH BOLTS

Pinched Head, Gimlet Point

Size ..... inches	5/16	⅜	½	⅝	¾
Price ..... each	.06	.07	.12	.15	.20

HOOK AND EXPANSION PLATES

SINGLE HOOK

Fig. 3278A

BEAM HOOK

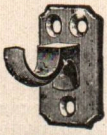


Fig. 3278B

CAST IRON HOOK PLATE

Fig. 3278C

EXPANSION HOOK PLATE

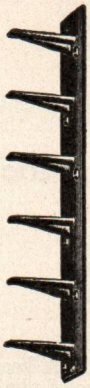


Fig. 3278D

GRABLER STEEL HOOK PLATE (Patented)

Fig. 3278E

CAST IRON HOOK PLATES

Number of Hooks	1	2	3	4	5	6
For 1 -in. Pipe, 2½ in. between Centers..each	.09	.18	.23	.26	.32	.38
" 1¼ " " 3 " " " "	.10	.21	.27	.32	.41	.52
" 1½ " " 3½ " " " "	.15	.28	.43	.58	.72	.88
" 2 " " 4½ " " " "	.22	.43	.65	.90	1.15	1.35

BEAM HOOKS, LONG SHANK

Size .....inches	½	¾	1	1¼	1½	2	2½	3
Price .....each	.13	.15	.18	.22	.24	.35	.65	.90

EXPANSION HOOK PLATES

Number of Hooks	1	2	3	4	5	6
For 1 -in. Pipe, 2½ in. between Centers.each	.15	.25	.35	.50	.60	.70
" 1¼ " " 3 " " " "	.17	.27	.40	.60	.70	.80
" 1½ " " 3½ " " " "	.25	.40	.60	.75	.90	1.00
" 2 " " 4½ " " " "	....	.60	.85	1.00	1 35	1.55

When hook plates are ordered, specifying a greater number of hooks than listed above, we will send two; for instance, an order calling for 1x8 hook plates we will send two 1x4 hook plates.

GRABLER SECTIONAL STEEL HOOK PLATES

Number of Hooks	30	30	25	20
For Pipe.....inches	1	1¼	1½	2
Price.....each	2.50	3.25	3.75	4.25

Furnished in long strips. As many hooks as desired can be easily cut off at ribs shown

FLOOR AND CEILING PLATES

AJAX HINGED ADJUSTABLE FLOOR AND CEILING PLATES

CLOSED

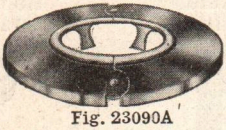


Fig. 23090A

OPEN

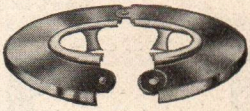


Fig. 23090B

Heavy stamped steel plates, neat and durable. They are held firmly to the pipe by four jaws, stamped to conform to the pipe. They are light and strong, will not break, will stay where placed, and can be cut to fit any specific conditions.

WARCO FLOOR AND CEILING PLATES

CLOSED

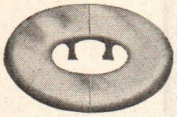


Fig. 23090C

OPEN

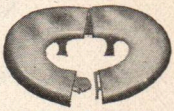


Fig. 23090D

Made of planished steel. A heavy stamped steel adjustable floor and ceiling plate having the appearance of a solid plate. Unique in design and substantially constructed. It is held firmly to the pipe by four jaws stamped to conform to the pipe.

AJAX AND WARCO ADJUSTABLE HINGED FLOOR AND CEILING PLATES

Size.....inches	⅛	¼	⅜	½	¾	1
Price, Black.....each	.14	.14	.15	.16	.17	.20
" Nickel-plated..... "	.25	.25	.26	.27	.28	.32
Size.....inches	1¼	1½	2	2½	3	...
Price, Black.....each	.22	.25	.30	.50	.65	...
" Nickel-plated..... "	.35	.38	.45	.65	.80	...

B & C FLOOR AND CEILING PLATES

No. 3 CAST FLOOR AND CEILING PLATE

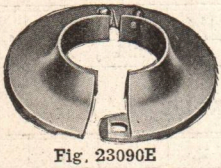


Fig. 23090E

No. 6 CAST FLOOR PLATE

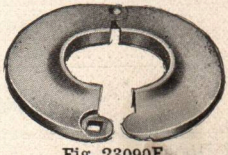


Fig. 23090F

No. 7 CAST FLOOR AND CEILING PLATE

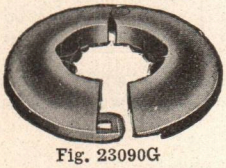


Fig. 23090G

No. 9 STAMPED STEEL FLOOR OR CEILING PLATE

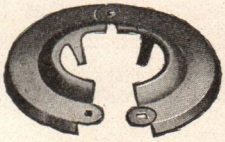


Fig. 23090H

No. 10 STAMPED STEEL FLOOR AND CEILING PLATE

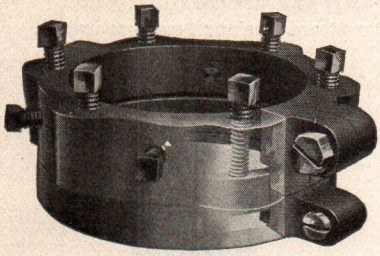
Fig. 23090J

Nos. 3, 6, 7, 9 AND 10

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Black...each	.14	.15	.16	.17	.20	.22	.25	.30	.50	.65
" N. P.... "	.25	.26	.27	.28	.32	.35	.38	.45	.65	.80
Size.....inches	3½	4	4½	5	6	7	8	9	10	....
Price, Black...each	.80	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	....
" N. P.... "	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	....

CLAMPS

SKINNER PIPE JOINT CLAMPS (FORMERLY THE CLIMAX)



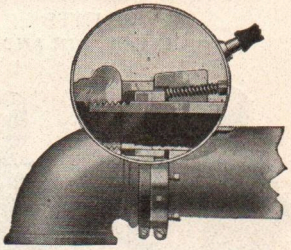


Fig. 721A

For repairing leaks where pipe is screwed into fitting—positively, permanently. Same principle as gland and stuffing box. The entire thrust is against the packing, and the lip on gasket container ring guides packing squarely into the threads. Clamp is made of malleable iron—it's sturdy, safe, scientific. Guaranteed successful on steam, hot or cold water, oil, gas, air, ammonia, or brine. Painted to resist rust and fitted with Tobin bronze thrust screws. In stock ½ to 24 inches. Packed in carton with complete directions. Made in halves held together by cap screws.

Size of Pipe, Inside Diameter ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Price .....each	1.50	1.50	1.50	1.90	2.25	3.00	3.75	4.50	5.25
Size of Pipe, Inside Diameter ....inches	4	4½	5	6	7	8	9	10	12
Price .....each	6.00	6.75	7.50	9.00	10.50	13.00	15.75	18.75	22.50
Size of Pipe, Outside Diameter ..inches	14	15	16	18	20	21	22	24	26
Price .....each	31.50	33.75	36.00	40.50	45.00	50.00	55.00	60.00	65.00

EMERGENCY PIPE CLAMPS

FOR ½ TO 4-INCH PIPE

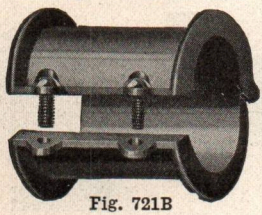


Fig. 721B

EXTRA HEAVY, FOR LARGE SIZES

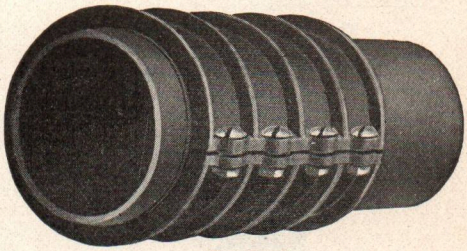


Fig. 721C

Every stationary and marine engineer, plumber, janitor and steam fitter has occasion to use repairs of this kind, and should always have them on hand to use in emergency. They can be attached in a moment, and the use of them often saves valuable property. Made of malleable iron. Being compact, they are available for pipes close together, as in coils.

Size of Pipe.....inches	½	¾	1	1¼	1½	2	2½	3	3½
Length .....inches	3¼	3¼	3½	3¾	4	4¼	4½	5	5½
Price .....each	.40	.45	.50	.60	.70	.80	1.00	1.25	1.50
Size of Pipe.....inches	4	4½	5	6	7	8	9	10	12
Length .....inches	6	6½	7	8	9	9½	10	11	12
Number of Bolts	..	2	3	3	3	3	3	4	4
Price.....each	2.00	4.50	5.00	6.00	7.00	8.00	9.00	10.00	12.00

Furnished complete with packing.

STEAM JOINTS AND WATER HEATERS

MORAN FLEXIBLE STEAM JOINTS

FOR STEAM, AIR AND GAS

No. 1 No. 2

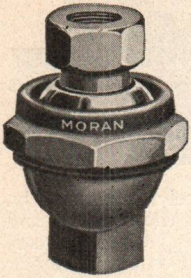


Fig. 25836A

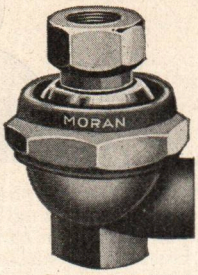


Fig. 25836B

Size Inches	Price, Each No. 1	Price, Each No. 2	Size Inches	Price, Each No. 1	Price, Each No. 2
1/8	2.75	3.00	3	11.25	12.25
1/4	3.00	3.25	3 1/2	14.00	15.50
3/8	3.00	3.25	4	15.00	16.75
1/2	3.25	3.50	4 1/2	18.75	20.75
3/4	3.75	4.00	5	18.75	20.75
1	4.25	4.50	6	25.00	27.50
1 1/4	5.25	5.50	*7	50.00	55.00
1 1/2	6.00	6.25	*8	55.00	65.00
2	7.50	8.75	*9	90.00	100.00
2 1/2	9.00	10.50	*10	100.00	120.00

*Screwed or flanged.

No. 3, FOR LIQUIDS

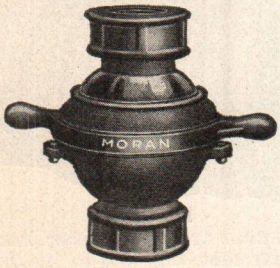


Fig. 25836C

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
1/8	2.75	1 1/2	6.00	5	18.75
1/4	3.00	2	7.50	6	25.00
3/8	3.00	2 1/2	9.00	7	50.00
1/2	3.25	3	11.25	8	55.00
3/4	3.75	3 1/2	14.00	9	90.00
1	4.25	4	15.00	10	100.00
1 1/4	5.25	4 1/2	18.75	..	.....

In ordering, state whether steam, air or liquid is to be conveyed.

BRASS SWING JOINTS

For Steam Working Pressures up to 125 Pounds

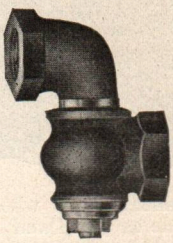


Fig. 25836D

Size Inches	Price, Each Rough	Price, Each Finished
1/2	2.50	3.00
3/4	3.50	4.00
1	5.00	5.75
1 1/4	6.50	7.25
1 1/2	9.00	10.00
2	13.00	15.00
2 1/2	22.00	24.50
3	30.00	33.00

Finished brass steam swing joints furnished to order only.

No. 914 SWIVEL COUPLINGS

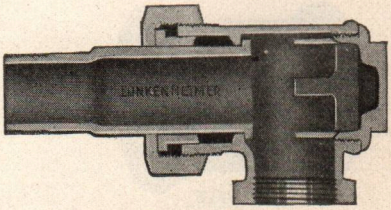


Fig. 25836E

Where a simple and convenient swivel coupling is desired, this coupling is recommended as being substantial and constructed of high-grade bronze composition.

Size Inches	Laterral Movt. Inches	Price, Each Rough Bronze	Price, Each Finished Bronze
1/2	3/8	3.00	3.90
3/4	1/2	3.80	4.50
1	11/16	5.80	7.00
1 1/4	13/16	8.40	10.00
1 1/2	15/16	11.00	12.60
2	1 1/8	14.60	16.60

BRASS AND IRON BODY EXPANSION JOINTS

BRASS

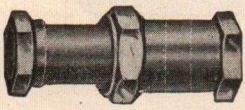


Fig. 785A

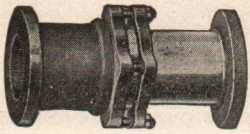


Fig. 785B

IRON BODY

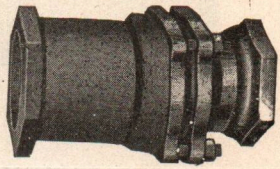


Fig. 785C

BRASS—SCREWED, STANDARD TRAVERSE

Size.....inches	½	¾	1	1¼	1½	2	2½	3
Traverse.....inches	2	2¼	2¼	2¼	2¼	2½	2½	2¾
Price.....each	1.50	2.20	2.75	4.00	5.00	8.00	17.50	24.00

BRASS—SCREWED, SPECIAL TRAVERSE

Traverse	Size.....inches	½	¾	1	1¼	1½	2	2½
4 inches	Price.....each	3.80	4.00	4.90	6.30	7.40	9.10	....
6 "	" ..... "	....	8.25	9.00	10.00	11.50	13.50	24.00
8 "	" ..... "	....	9.00	10.00	11.25	13.00	15.50	27.00
10 "	" ..... "	....	9.75	11.00	12.50	14.50	17.50	30.00
12 "	" ..... "	....	10.50	12.00	13.75	16.00	19.50	33.00

IRON BODY—SCREWED, STANDARD TRAVERSE

Size..inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Traverse..in.	2½	2½	2¾	3	3¼	3½	4	5	6	7	7	7	8
Price...each	7.00	8.00	10.00	14.00	18.00	30.00	38.00	45.00	70.00	100.00	110.00	160.00	225.00

IRON BODY—SCREWED, SPECIAL TRAVERSE

Traverse	Size.....inches	2	2½	3	3½	4	4½	5	6	7	8
6 inches	Price .....each	11.00	13.00	17.50	25.00	30.00	40.00	45.00	55.00	.....	.....
10 "	" ..... "	16.00	19.00	25.00	35.00	42.00	52.00	62.00	80.00	100.00	140.00
12 "	" ..... "	18.50	22.00	29.00	40.00	48.00	60.00	70.00	92.50	115.00	160.00
14 "	" ..... "	21.00	25.00	33.00	45.00	54.00	67.00	78.00	105.00	130.00	.....
16 "	" ..... "	23.50	28.00	37.00	50.00	60.00	75.00	86.00	117.50	145.00	.....
18 "	" ..... "	26.00	31.00	41.00	55.00	66.00	.....	94.00	130.00	.....	.....

IRON BODY—FLANGED, STANDARD TRAVERSE

Size.....inches	2	2½	3	3½	4	4½	5	6
Traverse.....inches	2½	2½	2¾	3	3¼	3½	4	5
Diameter of Flanges..... "	6	7	7½	8½	9	9¼	10	11
Price.....each	15.00	16.00	18.50	25.00	30.00	40.00	48.00	55.00

Size.....inches	7	8	9	10	12	14	15	16
Traverse.....inches	6	7	7	7	8	10	10	10
Diameter of Flanges..... "	12½	13½	15	16	19	21	22¼	23½
Price.....each	80.00	110.00	120.00	175.00	250.00	500.00	550.00	600.00

IRON BODY—FLANGED, SPECIAL TRAVERSE

Traverse	Size....in.	2	2½	3	3½	4	4½	5	6	7	8	10	12
6 in.	Price, each	18.00	20.00	25.00	35.00	40.00	50.00	55.00	65.00	.....	.....	.....	.....
10 "	" "	23.00	26.00	32.50	45.00	52.00	63.00	72.00	90.00	112.00	150.00	225.00	300.00
12 "	" "	25.50	29.00	36.50	50.00	58.00	70.00	80.00	102.50	127.00	170.00	255.00	350.00
14 "	" "	28.00	32.00	40.50	55.00	64.00	77.00	88.00	115.00	142.00	190.00	285.00	400.00
16 "	" "	30.50	35.00	44.50	60.00	70.00	85.00	96.00	127.50	157.00	210.00	315.00	.....
18 "	" "	33.00	38.00	48.50	65.00	76.00	.....	104.00	140.00	172.00	230.00	350.00	.....

The expansion will average about 2 to 3 inches in 100 feet of pipe.

SEAMLESS BRASS TUBING

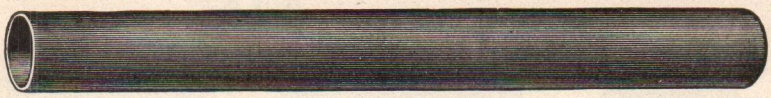


Fig. 4832A

IRON PIPE SIZES

EXTRAS OVER BASE PRICES

Iron Pipe Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price.....per pound	.08	.07	.02	.01	BASE PRICE				
Approx. Wt. per Foot...pounds	.25	.43	.62	.9	1.25	1.7	2.5	3	4

Iron Pipe Size.....inches	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8
Price.....per pound	BASE PRICE		.01	.02	.04	.06	.07	.09	.11
Approx. Wt. per Foot...pounds	5.75	8.3	10.9	12.7	13.9	15.75	18.31	26.28	29.88

Stock lengths, 12 feet.

CUTTING BRASS TUBING

ADDITIONAL TO LISTS

Length....inches	Over 12 up to 24 inclusive	Over 9 up to 12 inclusive	Over 6 up to 9 inclusive	Over 4 up to 6 inclusive	Over 2 up to 4 inclusive	Over 1 up to 2 inclusive	Over 3/4 up to 1 inclusive
Price...per pound	.01	.01 1/2	.02	.02 1/2	.03	.03 1/2	.04

No additional charge for cutting tubes to lengths over 24 inches.

For all seamless tubes of any shape other than round add to above price of corresponding size..... per pound
For tinning tubes inside and outside add..... .04 "
For tinning tubes on one side only " ..... .05 "
For tinning tubes in lengths not over three inches, on ends only, add not less than..... .01 per end

HIGH BRASS RODS

NOT LESS THAN 2-FOOT LENGTHS. BROWN & SHARPE'S GAUGE THE STANDARD

EXTRAS OVER BASE PRICES

Diameter.....	No. 11 to 1/8 inch inclusive	1/8 to 3/16-inch inclusive	3/16 to 3/8-inch inclusive	3/8 to 5/8-inch inclusive	5/8 to 2 1/2-inch inclusive
Round.....	.06 1/2	.03	.01	.00 1/2	BASE
Hexagon, Octagon and Square	.09	.05 1/2	.03 1/2	.03	.02
Rectangular and Half Round.	.11	.07 1/2	.05 1/2	.05	.04

Larger than 2 1/2 inches prices upon application.
Prices for rectangular and half round are governed by the thinner dimension.
Shapes other than those listed above, prices upon application.
Prices are for 100 pounds or more of one item in one order.

ADDITIONAL FOR CUTTING HIGH BRASS RODS LESS THAN 2 FEET

Length.....inches	*24 and over	12 to 24	9 to 12	6 to 9	4 to 6	2 to 4	1 to 2
Price.....per pound	.01	.02	.03	.04	.05	.08	.12

*Except stock lengths of 8, 10 and 12 feet.

SHORTER THAN 1 INCH, SPECIAL. NOT LESS THAN .12 LIST ADVANCE

SEAMLESS BRASS TUBING

OUTSIDE DIAMETER

EXTRAS OVER BASE PRICES

ADOPTED, NOV. 13, 1908

B. & S. Gauge	Stub's Gauge	Inches	Outside Diameter, Inches													
			3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
3 to 8	4 to 11	.238 to .120	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	12	.109	...	...	...	...	.06	.05	.05	.05	BASE PRICE					
10 to 11	13 or 3/32	.095	...	...	...	...	.07	.05	.05	.05						
12	14	.083	...	...	.07	.07	.07	.05	.05	.05	.01	.01	.01	.01	.01	.01
13	15	.072	...	.08	.07	.07	.07	.05	.05	.05	.01	.01	.01	.01	.01	.01
14	16 or 1/16	.065	.08	.08	.07	.07	.07	.05	.05	.05	.02	.02	.02	.02	.02	.02
15	17	.058	.08	.08	.07	.07	.07	.05	.05	.05	.03	.03	.03	.03	.03	.03
16	18	.049	.09	.09	.08	.08	.08	.06	.06	.06	.04	.04	.04	.04	.04	.04
17 to 18	19	.042	.09	.09	.08	.08	.08	.06	.06	.06	.05	.05	.05	.05	.05	.05
19	20	.035	.09	.09	.08	.08	.08	.06	.06	.06	.06	.06	.06	.06	.06	.07
20	21 or 1/32	.032	.11	.10	.10	.08	.08	.07	.07	.07	.07	.07	.07	.07	.07	...
21	22	.028	.13	.13	.11	.11	.09	.08	.08	.08	.08	.08	.08	.08	.08	...
22	23	.025	.15	.15	.13	.13	.11	.11	.11	.11	.11	.11	.11	.13	.15	...
23	24	.022	.31	.26	.24	.23	.22	.21	.19	.18	.18	.19	.19	.20	.21	...
24	25	.020	.34	.29	.27	.25	.24	.23	.22	.22	.23	.24	...	...	...	...

B. & S. Gauge	Stub's Gauge	Inches	Outside Diameter, Inches												
			2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4
3 to 8	4 to 11	.238 to .120	...	...	...	...	.01	.01	.01	.03	.03	.05	.05	.06	.06
9	12	.109	BASE PRICE				.02	.02	.02	.04	.04	.06	.06	.07	.07
10 to 11	13 or 3/32	.095					.03	.03	.03	.05	.05	.07	.07	.08	.08
12	14	.083	.01	.01	.01	.01	.04	.04	.04	.06	.06	.08	.08	.09	.09
13	15	.072	.01	.01	.01	.01	.06	.06	.06	.07	.07	.09	.09	.11	.11
14	16 or 1/16	.065	.02	.02	.02	.05	.06	.07	.08	.11	.11	.11	.16	.16	.16
15	17	.058	.03	.03	.05	.06	.07	.08	.09	.12	.12	.12	.17	.17	.17
16	18	.049	.04	.06	.07	.08	.09	.10	.11	.14	.14	.14	.20	.20	.20
17 to 18	19	.042	.07	.08	.09	.10	.11	.13	.15	.17	.21	.21	.25	.29	.31
19	20	.035	.07	.08	.09	.11	.11	.13	.19	.19	.23	.23	.31	.31	...

B. & S. Gauge	Stub's Gauge	Inches	Outside Diameter, Inches											
			6	6 1/4	6 1/2	6 3/4	7	7 1/4	7 1/2	7 3/4	8	8 1/2	9	9 1/2	10
3 to 8	4 to 11	.238 to 120	.07	.07	.07	.07	.07	.09	.09	.09	.11	.11	.11	.14	.17
9	12	.109	.08	.08	.08	.08	.08	.10	.10	.10	.12	.12	.12	.15	.18
10 to 11	13 or 3/32	.095	.09	.09	.09	.09	.09	.11	.11	.11	.13	.13	.13	.16	.19
12	14	.083	.10	.10	.10	.10	.10	.12	.12	.12	.14	.14	.14	...	...
13	15	.072	.14	.14	.14	.16	.16	.19	.19	.19	...	...	...	...	...
14	16 or 1/16	.065	.19	.19	.23	.23	.23	.26	.26	.26	...	...	...	...	...
15	17	.058	.20	.20	.24	.24	.24	.27	.27	.27	...	...	...	...	...
16	18	.049	.23	.23	.30	.30	.30	...	...	...	...	...	...	...	...
17 to 18	19	.042	.31	...	...	...	...	...	...	...	...	...	...	...	...

Sizes between gauges and diameters take the price of the gauge or diameter nearest.

To ascertain price of copper, bronze, gilding, low brass and admiralty tubes add the following advances to price of brass tubes:

Copper tubes, 3 cents per pound.

Bronze and gilding tubes, 3 cents per pound.

Low brass tubes, 3 cents per pound.

Admiralty tubes, 4 cents per pound.

RAILING FITTINGS

GAS FITTING PATTERN—MALLEABLE IRON

No. 61

Fig. 8141A

No. 62

Fig. 8141B

No. 63

Fig. 8141C

No. 64

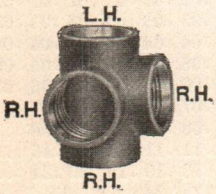


Fig. 8141D

No. 65

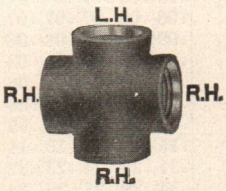


Fig. 8141E

No. 66

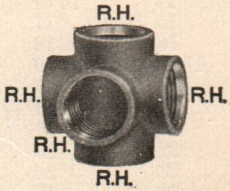


Fig. 8141F

Pipe Size.....inches	¾	1	1¼	1½	2	2½	3
Price, No. 61, Elbow, Black.....per lb.	.12	.12	.12	.12	.12	.12	.12
" " 61, " Galvanized..... "	.19	.19	.19	.19	.19	.19	.19
" " 62, " Side Outlet, Black..... "	.20	.20	.20	.20	.20	.20	.20
" " 62, " " " Galvanized... "	.28	.28	.28	.28	.28	.28	.28
" " 63, Tee, Black..... "	.12	.12	.12	.12	.12	.12	.12
" " 63, " Galvanized..... "	.19	.19	.19	.19	.19	.19	.19
" " 64, " Side Outlet, Black..... "	.20	.20	.20	.20	.20	.20	.20
" " 64, " " " Galvanized.. "	.28	.28	.28	.28	.28	.28	.28
" " 65, Cross, Black..... "	.20	.20	.12	.12	.12	.12	.12
" " 65, " Galvanized..... "	.28	.28	.19	.19	.19	.19	.19
" " 66, " Side Outlet, Black..... "	.20	.20	.20	.20	.20	.20	.20
" " 66, " " " Galvanized..... "	.28	.28	.28	.28	.28	.28	.28

Fittings larger than 2-inch are made to order.

Fittings will be furnished tapped, as shown in illustrations, or right-hand on all openings when so specified, at regular price. Those tapped otherwise will be charged at 15 per cent additional, net.

Reducing sizes will be made to order at a special price, and unless otherwise specified, will be tapped same as straight fittings, as shown in above illustrations.

Fittings will be reamed for slip joints, when so specified, at an additional price. Inquiries and orders should be accompanied by sketches showing clearly which openings are to be so reamed.

In ordering, describe the kind wanted by number and size. Black will always be furnished, unless galvanized is specified.

RAILING FITTINGS

BALL PATTERN MALLEABLE IRON AND BRASS

No. 1

Fig. 5602A

No. 2

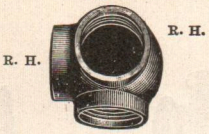


Fig. 5602B

No. 3

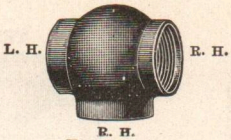


Fig. 5602C

No. 4

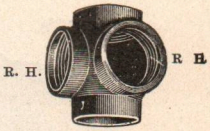


Fig. 5602D

No. 5

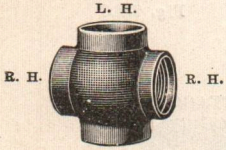


Fig. 5602E

No. 6

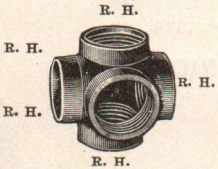


Fig. 5602F

No. 7

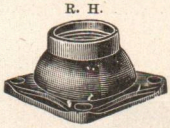


Fig. 5602G

No. 8

Fig. 5602H

No. 10

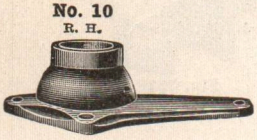


Fig. 5602J

No. 11

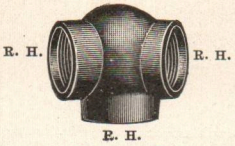


Fig. 5602K

No. 12

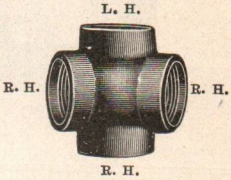


Fig. 5602M

Kind	Malleable Iron									Finished Brass					
Size ... inches	½	¾	1	1¼	1½	2	2½	3	4	½	¾	1	1¼	1½	2
No. 1, Elbow ... each	.15	.18	.20	.35	.45	.72	1.60	2.25	4.50	.40	.60	.80	1.20	1.60	2.50
" 2, " Side Outlet ... "	.20	.23	.25	.40	.50	.80	1.75	2.50	5.00	.75	1.00	1.10	1.70	2.00	3.00
" 3, Tee ... "	.20	.23	.25	.40	.50	.75	1.75	2.50	5.00	.60	.85	1.10	1.70	2.00	3.00
" 4, " Side Outlet ... "	.30	.33	.35	.45	.55	.90	1.90	2.60	5.25	1.05	1.25	1.50	2.00	2.40	3.50
" 5, Cross ... "	.30	.33	.35	.45	.58	1.00	1.80	2.60	5.25	1.05	1.25	1.50	2.00	2.40	3.50
" 6, " Side Outlet ... "	.35	.38	.40	.50	.65	1.35	2.00	2.75	5.50	1.20	1.45	1.70	2.25	3.00	4.00
" 7, Floor Flange, Square ... "	.16	.18	.20	.40	.50	.90	1.35	2.50	5.00	.75	.90	1.00	1.35	1.75	2.50
" 8, Ball Ornament ... "	.16	.18	.20	.25	.35	.90	1.35	2.00	4.25	.75	.90	1.00	1.35	1.75	2.50
" 10, Floor Flange, Long Base .. "	..	..	.30	.60	.75	1.25	...	...	...	...	...	...	...	...	...
" 11, 45° Ell, Side Outlet ... "	..	..	.50	.70	.90	1.50	...	...	...	...	...	...	...	...	...
" 12, 45° Tee, " " ... "	..	..	.55	.75	1.00	1.60	...	...	...	...	...	...	...	...	...

MALLEABLE REDUCING RAILING FITTINGS

Elbow, 1½x1¼	each	.52	Tee, 2x1¼	each	.85
" 2 x1¼	"	.82	" 2x2x1½	"	.85
" 2 x1½	"	.82	S. O. Tee, 1½x1½x1¼x1¼	"	.63
S. O. Elbow, 2x1½x1½	"	.92	" " " 2 x2 x1¼x1¼	"	1.05
Tee, 1¼x1½	"	.58	Cross, 1½x1½x1¼x1¼	"	.67
" 1½x1¼	"	.58	" 2 x2 x1¼x1¼	"	1.15
" 1¼x2	"	.85	" 2 x2 x1½x1½	"	1.15
" 1½x1½x2	"	.85	S. O. Cross, 2x2x1½x1½x1½	"	1.55

Order by number and size.

Furnished tapped, as shown in illustrations, or right-hand on all openings when so specified, at regular price. Tapped otherwise will be charged at 15 per cent additional price.

Add 50 per cent to list prices for galvanized malleable railing fittings.

FINISHED BRASS FITTINGS

MALLEABLE IRON PATTERN, IRON PIPE SIZE

For Steam Working Pressure up to 125 Pounds

ELBOW

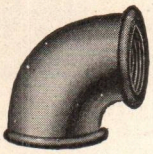


Fig. 732A

TEE

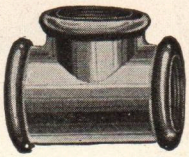


Fig. 732B

CROSS

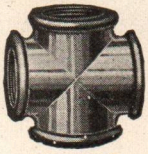


Fig. 732C

UNIONS

STANDARD

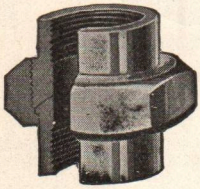


Fig. 732D

OCTAGON

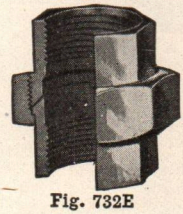


Fig. 732E

Size ..... inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Elbows, 90° ..... each	.30	.35	.45	.56	.75	1.10	1.55	2.00	3.00	5.50	9.00	14.00	17.50
" Reducing ..... "	..	.44	.55	.70	.95	1.40	1.90	2.50	3.75	6.75	11.25	17.50	22.00
" 45° ..... "	.38	.45	.55	.66	.85	1.23	1.70	2.20	3.25	6.00	9.75	15.50	19.50
" Street ..... "	.47	.52	.63	.83	1.08	1.45	2.30	3.00	4.50	8.50	13.75	....	....
" Side Outlet .... "	..	1.05	1.35	1.70	2.25	3.30	4.70	6.00	9.00	16.50	27.00	....	....
" Drop, Female .. "	..	..	.85	1.05	1.40	2.00	2.80	3.60	5.40	....	....	....	....
Tees ..... "	.42	.49	.63	.80	1.05	1.50	2.15	2.80	4.20	7.75	12.75	19.50	24.50
" Reducing ..... "	..	.60	.77	1.00	1.30	1.85	2.65	3.50	5.25	9.75	15.80	24.50	30.50
" Drop, Single Ear .. "	..	..	1.13	1.37	1.80	2.55	3.65	4.70	7.00	....	....	....	....
" " Double " .. "	..	..	1.28	1.54	2.05	3.00	4.25	5.50	8.40	....	....	....	....
" Side Outlet ..... "	..	..	..	2.05	2.70	3.90	5.70	7.40	11.50	....	....	....	....
Crosses ..... "	.60	.70	.90	1.10	1.50	2.20	3.10	4.00	6.00	11.00	18.00	28.00	35.00
" Reducing ..... "	..	.88	1.10	1.40	1.85	2.75	3.85	5.00	7.50	13.75	22.50	35.00	44.00
Couplings ..... "	.24	.28	.36	.46	.63	.90	1.30	1.60	2.35	4.00	5.75	9.75	12.50
" R. and L. .... "	.31	.37	.47	.58	.80	1.15	1.65	2.10	3.00	5.10	7.50	....	....
" Reducing ..... "	..	.35	.45	.56	.75	1.05	1.55	1.90	2.75	4.75	7.00	12.00	15.50
Bushings, Regular ..... "	..	.22	.27	.35	.47	.70	1.00	1.40	2.00	3.00	4.50	6.25	8.00
Plugs, Regular ..... "	.23	.30	.37	.43	.55	.75	1.00	1.30	1.95	3.00	4.25	6.25	8.00
" Solid ..... "	..	..	.43	.50	.65	.90	1.35	1.90	2.90	4.50	6.50	10.00	13.00
" Countersunk ..... "	..	..	..	.42	.55	.80	1.15	1.55	2.25	....	....	....	....
Caps ..... "	.20	.25	.31	.40	.55	.77	1.10	1.50	2.25	4.00	5.50	8.00	10.00
Locknuts ..... "	.24	.25	.32	.40	.50	.65	.85	1.10	1.60	3.25	4.75	6.50	8.00
Return Bends, Close .... "	.85	1.00	1.30	1.55	2.05	2.65	3.75	4.90	7.25	13.00	19.00	....	....
" " Open .... "	.95	1.10	1.35	1.65	2.15	2.80	4.10	5.40	7.75	14.25	20.00	....	....
"Y" Bends ..... "	..	..	1.35	1.60	2.15	3.05	4.45	5.70	8.50	15.50	25.00	33.00	41.00
Unions, Standard, Polished ... "	.50	.60	.85	1.05	1.40	1.90	2.75	3.25	5.00	9.00	14.00	25.00	33.00
" " " & Tinned "	.65	.75	1.05	1.30	1.70	2.35	3.30	3.85	5.90	10.20	16.25	28.00	36.75
" Octagon, Polished ... "	.85	.90	1.15	1.45	1.90	2.50	3.35	4.25	6.00	10.00	16.00	25.00	33.00

STOP AND STOP AND WASTE COCKS

FLAT WAY, FOR IRON PIPE
"T" HANDLE

STOP

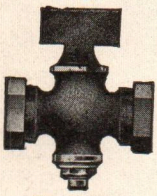


Fig. 5031A

STOP AND WASTE

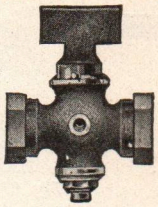


Fig. 5031B

STOPS

Size.....inches	3/8	1/2	5/8	3/4
Price. Rough.....per dozen	20.40	21.00	29.40	36.00
Size.....inches	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	52.80	89.40	149.40	258.00

STOP AND WASTES

Size.....inches	3/8	1/2	5/8	3/4
Price, Rough.....per dozen	21.00	21.60	30.00	36.60
Size.....inches	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	54.00	91.20	152.40	264.00

LEVER HANDLE

STOP

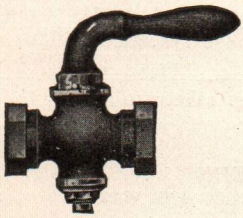


Fig. 5031C

STOP AND WASTE

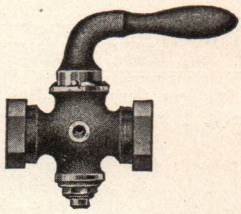


Fig. 5031D

STOPS

Size.....inches	3/8	1/2	5/8	3/4
Price, Rough.....per dozen	20.40	21.00	29.40	36.00
" Finished..... "	25.20	25.80	35.40	45.00
" Nickel-plated..... "	30.00	30.60	41.40	54.00
Size.....inches	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	52.80	89.40	149.40	258.00
" Finished..... "	64.80	107.40	179.40	300.00
" Nickel-plated..... "	76.80	125.40	209.40	342.00

STOP AND WASTES

Size.....inches	3/8	1/2	5/8	3/4
Price, Rough.....per dozen	21.00	21.60	30.00	36.60
" Finished..... "	25.80	26.40	36.00	45.60
" Nickel-plated..... "	30.60	31.20	42.00	54.60
Size.....inches	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	54.00	91.20	152.40	264.00
" Finished..... "	66.00	109.20	182.40	306.00
" Nickle-plated..... "	78.00	127.20	212.40	348.00

MUELLER STOP AND STOP AND WASTE COCKS

PATENT CAP

STRAIGHTWAY

STOP

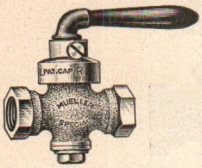


Fig. 6704A

STOP AND WASTE

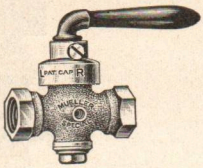


Fig. 6704B

ROUND WAY

STOP

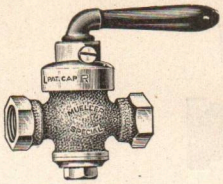


Fig. 6704C

STOP AND WASTE

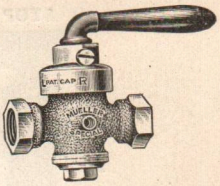


Fig. 6704D

STRAIGHTWAY

Size ..... inches	3/8	1/2	5/8	1/3
Price, Stop, Rough ..... per doz.	20.40	21.00	29.40	36.00
" " and Waste, Rough ..... "	21.00	21.60	30.00	36.60
Size ..... inches	1	1 1/4	1 1/2	2
Price, Stop, Rough ..... per doz.	52.80	89.40	149.40	258.00
" " and Waste, Rough ..... "	54.00	91.20	152.40	264.00

ROUND WAY

Size ..... inches	3/8	1/2	5/8	3/4
Price, Stop, Rough ..... per doz.	25.20	26.40	36.00	46.20
" " and Waste, Rough ..... "	25.80	27.00	36.60	46.80
Size ..... inches	1	1 1/4	1 1/2	2
Price, Stop, Rough ..... per doz.	73.80	120.60	197.40	342.00
" " and Waste, Rough ..... "	75.00	122.40	200.40	348.00

Malleable iron lever handles will be furnished unless otherwise specified. Galvanized malleable T handles at same price.

ROUND WAY, H PATTERN

STOP

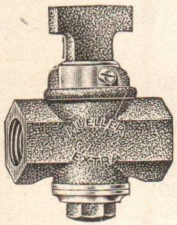


Fig. 6704E

STOP AND WASTE

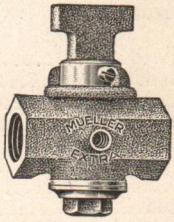


Fig. 6704F

Size ..... inches	1/2	5/8	3/4	1
Price, Stop, Lever or T Handle, Rough ..... per doz.	23.40	32.40	41.40	67.20
" " and Waste, Lever or T Handle, Rough. "	24.00	33.00	42.00	68.40
Size ..... inches	1 1/4	1 1/2	2	.....
Price, Stop, Lever or T Handle, Rough ..... per doz.	106.20	171.00	294.00	.....
" " and Waste, Lever or T Handle, Rough. "	108.00	174.00	300.00	.....

GROUND KEY BIBBS

PLAIN BIBB, FOR LEAD PIPE

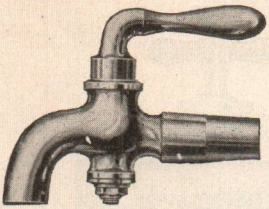


Fig. 1719A

PLAIN BIBB, FOR IRON PIPE

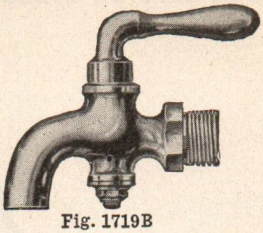


Fig. 1719B

HOSE BIBB, FOR IRON PIPE

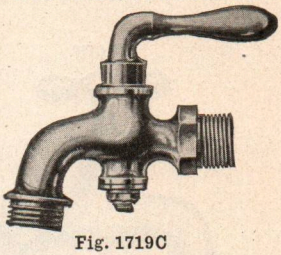


Fig. 1719C

PLAIN BIBBS, FOR LEAD PIPE

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	21.60	22.20	31.20	56.40	94.80	158.40	273.00
" Finished.... "	26.40	27.00	37.20	68.40	112.80	188.40	315.00
" Nickel-plated "	31.20	31.80	43.20	80.40	130.80	218.40	357.00

PLAIN BIBBS, FOR IRON PIPE

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	20.40	21.00	29.40	52.80	89.40	149.40	258.00
" Finished... "	25.20	25.80	35.40	64.80	107.40	179.40	300.00
" Nickel-plated "	30.00	30.60	41.40	76.80	125.40	209.40	342.00

HOSE BIBBS, FOR LEAD PIPE

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	24.60	25.20	34.20	63.60	105.60	173.40	295.20
" Finished.... "	29.40	30.00	40.20	75.60	123.60	203.40	337.20
" Nickel-plated "	34.20	34.80	46.20	87.60	141.60	233.40	379.20

HOSE BIBBS, FOR IRON PIPE

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	23.40	24.00	32.40	60.00	100.20	164.40	280.20
" Finished.... "	28.20	28.80	38.40	72.00	118.20	194.40	322.20
" Nickel-plated "	33.00	33.60	44.40	84.00	136.20	224.40	364.20

FOR IRON PIPE, S. O. T.

PLAIN BIBB

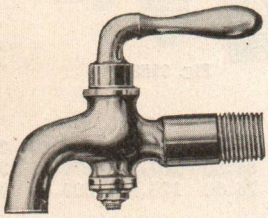


Fig. 1719D

HOSE BIBB

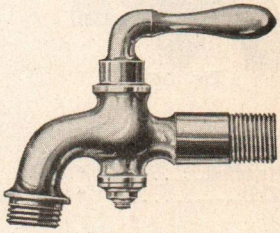


Fig. 1719E

PLAIN BIBBS

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	22.80	23.40	32.40	60.00	100.20	164.40	288.00
" Finished.... "	27.60	28.20	38.40	72.00	118.20	194.40	330.00
" Nickel-plated "	32.40	33.00	44.40	84.00	136.20	224.40	372.00

HOSE BIBBS

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per dozen	25.80	26.40	35.40	67.20	111.00	179.40	310.20
" Finished.... "	30.60	31.20	41.40	79.20	129.00	209.40	352.20
" Nickel-plated "	35.40	36.00	47.40	91.20	147.00	239.40	394.20
Add for Hexagon.. "	1.80	1.80	1.80	3.00	4.20	6.00	7.80

COMPRESSION AND GROUND KEY BIBBS

FOR IRON PIPE

COMPRESSION BIBBS

PLAIN

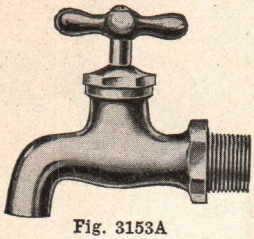


Fig. 3153A

HOSE

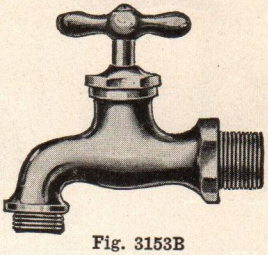


Fig. 3153B

PLAIN BIBBS

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per doz.	16.80	17.40	22.80	54.00	106.80	139.20	282.00
" Finished..... "	18.60	19.80	25.20	60.00	114.00	150.00	300.00
" N. P..... "	22.20	23.40	28.80	66.00	124.80	165.00	330.00

HOSE BIBBS

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per doz.	19.80	20.40	25.80	61.20	117.60	154.20	304.20
" Finished..... "	21.60	22.80	28.20	67.20	124.80	165.00	322.20
" N. P..... "	25.20	26.40	31.80	73.20	135.60	180.00	352.20

LEVER HANDLE GROUND KEY BIBBS

PLAIN

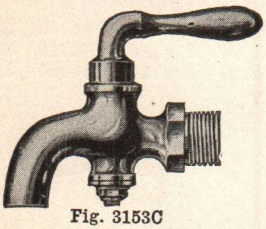


Fig. 3153C

HOSE

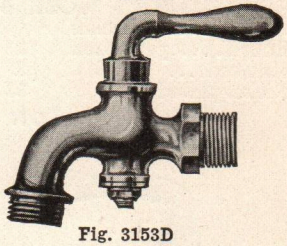


Fig. 3153D

PLAIN BIBBS

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per doz.	20.40	21.00	29.40	52.80	89.40	149.40	258.00
" Finished..... "	25.20	25.80	35.40	64.80	207.40	179.40	300.00
" N. P..... "	30.00	30.60	41.00	76.80	125.40	209.40	342.00

HOSE BIBBS

Size.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price, Rough.....per doz.	23.40	24.00	32.40	60.00	100.20	164.40	280.20
" Finished..... "	28.20	28.80	38.40	72.00	118.20	194.40	322.20
" N. P..... "	33.00	33.60	44.40	84.00	136.20	224.40	364.20

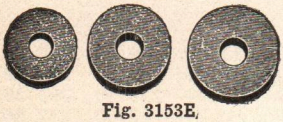


Fig. 3153E

BIBB WASHERS

Size.....inches	3/8, 1/2, 5/8, 3/4, 1
Price, Fiber.....per hundred	.50
" Hard Rubber..... "	1.00
" Boss..... "	1.00
" Jenkins Soft..... "	1.50

BRASS STEAM AND GAS SERVICE COCKS

STEAM COCKS

For Steam Working Pressures up to 100 Pounds

FLAT HEAD SQUARE HEAD

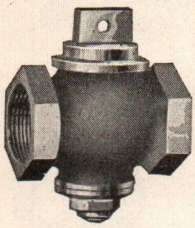


Fig. 23089A

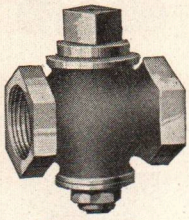


Fig. 23089B

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
¼	.85	1	2.35	2½	14.50
⅜	1.00	1¼	3.70	3	22.50
½	1.25	1½	4.85	*3½	38.50
¾	1.70	2	7.30	*4	50.00

*Furnished to order only.

HEAVY SQUARE OR FLAT HEAD STEAM COCKS

For Steam Working Pressures up to 125 Pounds

½	1.25	1¼	3.70	2½	14.50
¾	1.70	1½	4.85	3	22.50
1	2.35	2	7.30	...	.....

EXTRA HEAVY HARD METAL STEAM COCKS

For Steam Working Pressures up to 250 Pounds

¼	1.40	1	3.60	2½	23.00
⅜	1.75	1¼	6.00	3	35.00
½	1.75	1½	7.75	...	.....
¾	2.40	2	11.50	...	.....

THREE-WAY STEAM COCKS

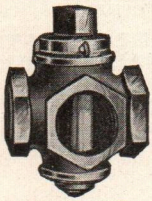


Fig. 23089C

For Steam Working Pressures up to 100 Pounds

¼	1.80	1	3.75	2½	18.75
⅜	2.10	1¼	5.75	3	26.00
½	2.50	1½	7.15	...	.....
¾	3.00	2	11.00	...	.....

FOUR-WAY STEAM COCKS

With square head, in sizes ½ to 2 inches. Furnished to order only.

GAS SERVICE COCKS

FLAT HEAD SQUARE HEAD

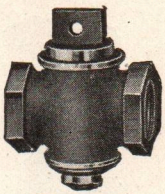


Fig. 23089D

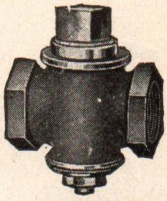


Fig. 23089E

STANDARD FLAT HEAD, SQUARE HEAD AND TEE HANDLE

Size Inches	Price, Each Without Check	Price, Each With Check	Size Inches	Price, Each Without Check	Price, Each With Check
¼	.90	....	1¼	3.25	3.70
⅜	1.00	1.15	1½	4.60	5.10
½	1.10	1.30	2	8.00	8.75
¾	1.30	1.55	2½	17.50	18.50
1	2.10	2.40	3	27.00	28.25

Tee handle ¼-inch to ¾-inch only.

EXTRA HEAVY FLAT AND SQUARE HEAD

¼	1.10	....	1¼	4.50	4.95
⅜	1.20	1.35	1½	6.50	7.00
½	1.30	1.50	2	11.20	11.95
¾	1.80	2.05	2½	24.50	25.50
1	3.00	3.30	3	37.80	39.05

SPECIAL HEAVY GAS SERVICE COCKS

FLAT AND SQUARE HEAD

½	1.30	1.50	1¼	4.50	4.95
¾	1.80	2.05	1½	6.50	7.00
1	3.00	3.30	2	11.20	11.95

WRENCHES

SQUARE HEAD FLAT HEAD

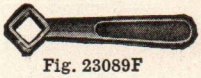


Fig. 23089F

Fig. 23089G

SQUARE HEAD WRENCHES

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
¼	.05	1	.14	2½	.56
⅜	.06	1¼	.19	3	.56
½	.07	1½	.25	3½	1.00
¾	.09	2	.44	4	1.00

FLAT HEAD WRENCHES

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
½	.07	1	.14	1½	.44
¾	.09	1¼	.25	2	.56

BRASS GLOBE, ANGLE AND CROSS VALVES

STANDARD BRASS VALVES WITH BRASS DISC

GLOBE

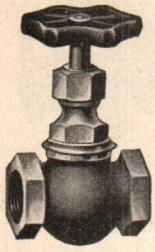


Fig. 17605A

ANGLE

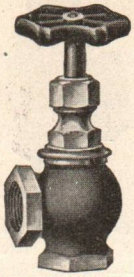


Fig. 17605B

Sizes 3-inch and smaller, for steam working pressures up to 125 pounds. Sizes 3½ and 4-inch up to 100 pounds steam working pressures.

CROSS

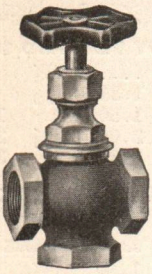


Fig. 17605C

These valves are well proportioned, are of good weight and sufficiently strong to stand the steam working pressures as given above.

Size Inches	Price, Each — Globe and Angle Screwed	Globe and Angle Flanged	Cross Screwed	Cross Flanged
⅛	.72	....	....	....
¼	.72	....	1.25	....
⅜	.77	....	1.25	....
½	1.00	4.50	1.50	....
¾	1.26	5.00	2.00	....
1	1.80	6.75	2.50	9.00
1¼	2.52	8.50	3.50	12.00
1½	3.50	10.50	5.00	15.75
2	5.30	16.00	8.00	22.00
2½	10.00	23.00	16.00	33.00
3	14.40	35.00	24.00	45.00
3½	26.50	50.00	.....	.....
4	36.00	70.00	.....	.....
5	.....	125.00	.....	.....
6	.....	200.00	.....	.....

NEEDLE POINT VALVES WITH NON-HEATING WHEEL

GLOBE

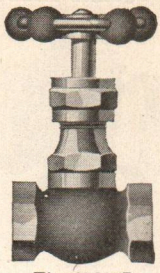


Fig. 17605D

ANGLE

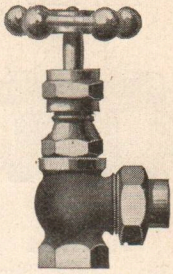


Fig. 17605E

For working pressures up to 125 pounds. Owing to the long, tapering seat bearing and the fine pitch of threads on stem, the valves can be regulated to as fine a degree of opening as desired.

SECTIONAL

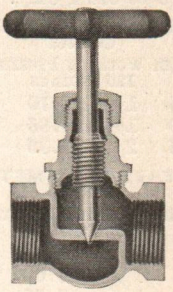


Fig. 17605F

GLOBE AND ANGLE FEMALE OPENINGS

Size Inches	Feed Opening Inches	Price Each
⅛, ¼	1/16	1.40
⅜	⅛	1.50
½	3/16	2.00
¾	¼	2.50

ANGLE WITH UNION

¼	1/16	2.00
⅜	⅛	2.20
½	3/16	3.00
¾	¼	3.50

These valves are used for regulating fuel oil feed, and are made to order only.

In ordering, state size of opening for feed; otherwise will furnish as above.

STANDARD BRASS CHECK VALVES

HORIZONTAL CHECK VALVES

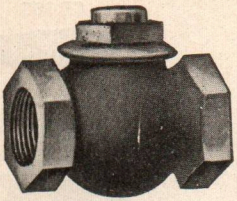


Fig. 22861A

Sizes 3-inch and smaller, for steam working pressures up to 125 pounds. Sizes 3½ and 4-inch for steam working pressures up to 100 pounds.

Size Inches	Price, Each Screwed	Price, Each Flanged	Size Inches	Price, Each Screwed	Price, Each Flanged
*⅛	.65	....	1½	3.15	10.15
*¼	.65	....	2	4.75	15.50
*⅜	.70	....	2½	9.00	22.00
½	.90	....	3	13.00	33.50
¾	1.15	4.90	3½	24.00	47.50
1	1.60	6.50	4	32.50	66.50
1¼	2.25	8.25	...	.....	.....

*Ball pattern.

HORIZONTAL CHECK VALVES WITH DRIP COCKS

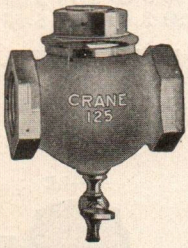


Fig. 22861B

For steam working pressure up to 125 pounds.

WITH DRIP COCK

Size Inches	Price Each	Size Inches	Price Each
½	2.15	1	3.15
¾	2.55	1¼	4.05

TAPPED WITHOUT DRIP COCK

Size Inches	Price Each	Size Inches	Price Each
½	1.85	1	2.70
¾	2.20	1¼	3.60

VERTICAL AND ANGLE CHECK VALVES

VERTICAL

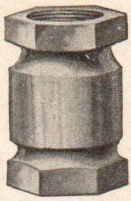


Fig. 22861C

ANGLE

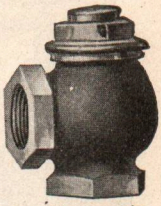


Fig. 22861D

For steam working pressure up to 125 pounds. Screwed ends.

Size Inches	Price, Each Vertical	Price, Each Angle	Size Inches	Price, Each Vertical	Price, Each Angle
¼	.72	.72	1¼	2.52	2.52
⅜	.77	.77	1½	3.50	3.50
½	1.00	1.00	2	5.30	5.30
¾	1.26	1.26	2½	....	10.00
1	1.80	1.80	3	....	14.40

BALL

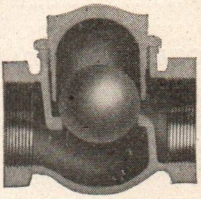


Fig. 22861E

SWING

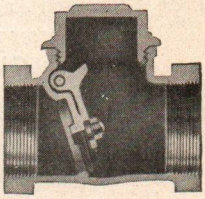


Fig. 22861F

BALL CHECK VALVES

For steam working pressures up to 125 pounds.

Size Inches	Price Each	Size Inches	Price Each
½	1.60	1¼	4.00
¾	2.30	1½	6.20
1	3.10	2	9.40

Can be furnished with drip cock at an extra price.

SWING CHECK VALVES

For steam working pressure up to 125 pounds. May be used in a horizontal or vertical position.

Size Inches	Price, Each Brass Disc	Price, Each Leather Disc	Size Inches	Price, Each Brass Disc	Price, Each Leather Disc
⅜	1.80	2.40	1½	4.75	6.00
½	2.00	2.65	2	6.75	8.25
¾	2.25	2.90	2½	15.00	....
1	2.80	3.60	3	24.00	....
1¼	3.65	4.65	...	.....	....

STANDARD BRASS VALVES

WITH JENKINS DISC

GLOBE

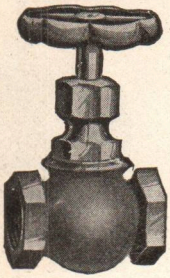


Fig. 3627A

ANGLE

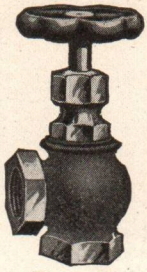


Fig. 3627B

CROSS

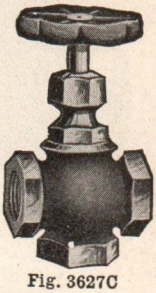


Fig. 3627C

GLOBE, ANGLE AND CROSS—SCREWED

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Globe and Angle...each	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75	15.75	22.00
" Cross..... "	1.70	2.00	2.25	2.50	3.25	4.75	6.25	9.50	20.00	27.50

GLOBE, ANGLE AND CROSS—FLANGED

Size.....inches	¾	1	1¼	1½	2	2½	3
Price, Globe and Angle.....each	5.00	6.00	9.00	11.00	16.50	25.00	34.00
" Cross ..... "	8.00	9.00	12.00	15.00	23.00	33.00	44.00

GLOBE AND ANGLE—WITH WOOD WHEEL

Size.....inches	½	¾	1	1¼	1½	2
Price, Rough Body, Plain.....each	2.00	2.50	3.20	4.50	6.25	10.50
" " " Nickel-plated All Over..... "	2.40	2.90	3.60	4.90	6.65	10.90
" Finished All Over..... "	2.50	3.00	3.75	5.25	7.25	11.75
" " and Nickel-plated All Over..... "	2.90	3.40	4.15	5.65	7.65	12.15

GLOBE AND ANGLE—WITH FINISHED BRASS WHEEL

Size.....inches	½	⅝	1	1¼	1½	2
Price, Finished All Over.....each	3.50	4.00	4.75	6.50	8.50	13.00
" " and Nickel-plated All Over..... "	4.15	4.65	5.40	7.15	9.15	13.65

CHECK

HORIZONTAL

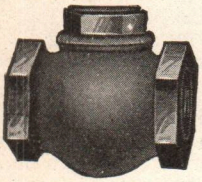


Fig. 3627D

ANGLE

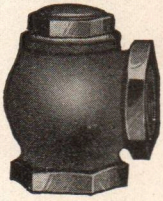


Fig. 3627E

HORIZONTAL OR ANGLE—SCREWED

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price.....each	1.10	1.20	1.30	1.90	2.60	3.60	5.00	7.50	13.50	21.00

HORIZONTAL OR ANGLE—FLANGED

Size.....inches	½	¾	1	1¼	1½	2	2½	3
Price.....each	4.00	5.00	6.00	8.00	10.00	15.00	23.00	32.00

JENKINS BRASS VALVES

GLOBE

SCREWED

Fig. 7488A

FLANGED

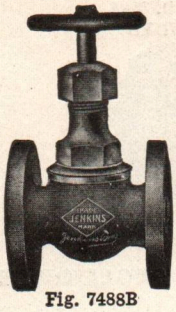


Fig. 7488B

ANGLE SCREWED

Fig. 7488C

CROSS SCREWED

Fig. 7488D

STANDARD PATTERN—For 150 Pounds Pressure

Size.....inches	1/8	1/4	3/8	1/2	3/4	1
Price, Globe or Angle, Screwed.....each	1.10	1.10	1.25	1.60	2.20	2.80
" " " " Flanged..... "	....	3.50	4.00	4.00	5.00	6.00
" Cross, Screwed..... "	....	1.70	2.00	2.25	2.50	3.25
" " Flanged..... "	....	....	....	7.00	8.00	9.00
Size.....inches	1 1/4	1 1/2	2	2 1/2	3	....
Price, Globe or Angle, Screwed.....each	4.00	5.50	8.75	15.75	22.00	....
" " " " Flanged..... "	9.00	11.00	16.50	25.00	34.00	....
" Cross, Screwed..... "	4.75	6.25	9.50	20.00	27.50	....
" " Flanged..... "	12.00	15.00	23.00	33.00	44.00	....

EXTRA HEAVY PATTERN, GLOBE OR ANGLE—For 300 Pounds Pressure

Size.....inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Screwed..each	3.00	3.50	4.00	5.00	6.50	8.25	11.00	16.00	33.00	45.00
" Flanged.. "	....	....	6.00	7.50	10.00	13.00	17.00	24.00	43.00	57.00

JENKINS DISCS

Round Hole, for 1/4, 3/8, 1/2 and 2 1/2-inch and larger valves.

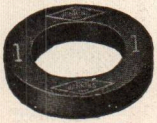


Fig. 7488E

Square Hole, for 3/4, 1, 1 1/2 and 2-inch valves.

Fig. 7488F

STEAM METAL

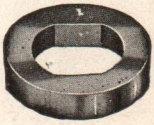


Fig. 7488G

STANDARD—For 150 Pounds Pressure

Size.....inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2
Price.....each	.03	.04	.04	.05	.06	.09	.12	.18	.24	.40	.50	.60	.70
Size.....inches	5	6	7	8	9	10	12	14	16	18	20	22	24
Price.....each	.80	1.00	1.20	1.40	1.80	2.25	2.50	3.50	4.00	5.00	6.00	7.50	9.00

STEAM METAL DISCS—For Extreme Pressure

Size.....inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2
Price.....each	.14	.14	.16	.20	.22	.28	.30	.34	.60	.85	1.35
Size.....inches	4	4 1/2	5	6	7	8	9	10	12	14	....
Price.....each	1.60	2.00	2.30	2.60	3.70	4.00	5.25	5.60	7.30	9.80	....

JENKINS BRASS CHECK VALVES

Standard Pattern, for 150 Pounds Pressure

HORIZONTAL SCREWED

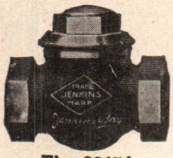


Fig. 3845A

HORIZONTAL FLANGED

Fig. 3845B

ANGLE SCREWED

Fig. 3845C

STANDARD PATTERN, HORIZONTAL, ANGLE OR VERTICAL—SCREWED

Size....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price....each	1.10	1.10	1.20	1.30	1.90	2.60	3.60	5.00	7.50	14.00	21.00

STANDARD PATTERN, HORIZONTAL, ANGLE OR VERTICAL—FLANGED

Size.....inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price.....each	4.00	5.00	6.00	8.00	10.00	15.00	23.00	32.00

EXTRA HEAVY PATTERN, HORIZONTAL OR ANGLE

For 300 Pounds Pressure

Size.....inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Screwed.....each	3.00	3.50	4.50	5.50	7.75	11.50	21.00	30.00
" Flanged..... "	5.00	6.50	8.50	10.50	14.25	20.00	31.00	42.00

SWING CHECK VALVES

NEW STYLE STANDARD PATTERN

SCREWED

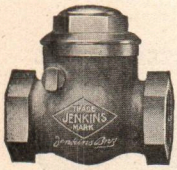


Fig. 3845D

FLANGED

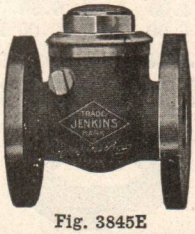


Fig. 3845E

EXTRA HEAVY SCREWED

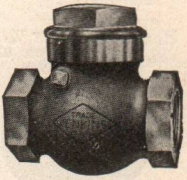


Fig. 3845F

NEW STYLE STANDARD PATTERN—SCREWED

Size.....inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price.....each	1.20	1.20	1.30	1.90	2.60	3.60	5.00	7.50	14.00	21.00

NEW STYLE STANDARD PATTERN—FLANGED

Size.....inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price.....each	4.00	5.00	6.00	8.00	10.00	15.00	23.00	32.00

EXTRA HEAVY PATTERN

For 300 Pounds Pressure

Size.....inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Screwed.....each	3.00	3.50	4.50	5.50	7.75	11.50	21.00	30.00
" Flanged..... "	5.00	6.50	8.50	10.50	14.25	20.00	31.00	42.00

LUNKENHEIMER REGRINDING BRONZE VALVES

MEDIUM PATTERN

For 200 Pounds Working Pressure

No. 407, GLOBE

Fig. 8934A

No. 408, ANGLE

Fig. 8934B

No. 588, CROSS

Fig. 8934C

The large sale of Lunkenheimer Regrinding Valves has demonstrated that steam users appreciate the fact that it is possible to secure in them a *reliable* valve, which can be repaired without disconnecting pipes or incurring any expense other than the slight labor involved in regrinding the seating surfaces.

Size ..... inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4
Price, No. 407, Globe ..... each	.70	.70	.85	1.15	1.45	2.00	2.80
" " 408, Angle ..... "	.70	.70	.85	1.15	1.45	2.00	2.80
" " 588, Cross ..... "	1.00	1.00	1.00	1.50	2.00	2.70	3.50

Size ..... inches	1 1/2	2	2 1/2	3	3 1/2	4	....
Price, No. 407, Globe ..... each	3.90	6.20	12.00	16.50	30.00	40.00	....
" " 408, Angle ..... "	3.90	6.20	12.00	16.50	30.00	40.00	....
" " 588, Cross ..... "	5.10	8.00	16.00	24.00	38.00	50.00	....

EXTRA HEAVY PATTERN

For 300 Pounds Working Pressure

No. 409, GLOBE

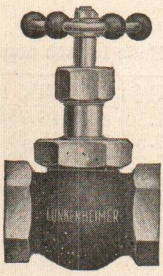


Fig. 8934D

No. 557, ANGLE

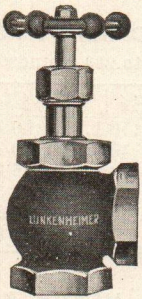


Fig. 8934E

No. 620, CROSS

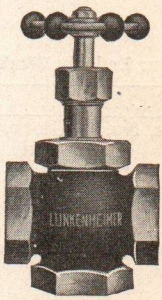


Fig. 8934F

Size ..... inches	1/4	3/8	1/2	3/4	1	1 1/4
Price, No. 409, Globe ..... each	.90	1.10	1.50	2.30	3.60	5.10
" " 557, Angle ..... "	.90	1.10	1.50	2.30	3.60	5.10
" " 620, Cross ..... "	1.20	1.30	1.90	2.90	4.50	6.30

Size ..... inches	1 1/2	2	2 1/2	3	3 1/2	4
Price, No. 409, Globe ..... each	7.10	10.90	19.50	29.00	42.30	53.90
" " 557, Angle ..... "	7.10	10.90	19.50	29.00	42.30	53.90
" " 620, Cross ..... "	8.60	13.10	23.40	34.50	50.40	63.60

LUNKENHEIMER RENEWO BRONZE VALVES

No. 73, GLOBE SECTIONAL

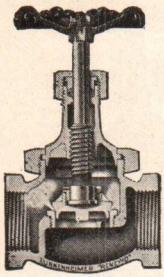


Fig. 5844A

For the benefit of the trade preferring a renewable seat regrinding valve rather than the regrinding type, the Renewo Valve has been designed.

This valve differs from the regrinding valve only in the construction of the disc and seat. The disc is provided with a projecting ring, which enters the valve seat ring. Its principal function is the preservation of the seat, which is accomplished in a two-fold manner. First, as it enters the seat, it deflects the current of steam from the seat ring face, thus preventing the wire-drawing which would otherwise occur. This feature is especially important should the valve be left partly open for any length of time. Secondly, the seating surface is kept free from scale and grit by the action of the thin current of steam discharged over it as the disc is brought home.

No. 72, ANGLE

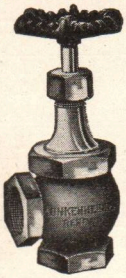


Fig. 5844B

No. 71, CROSS

Fig. 5844C

MEDIUM PATTERN

Screw Ends for Working Pressures up to 200 pounds; with B-H Flange Ends for 150 pounds

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, No. 73, Globe, Screwed, each	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75	15.75	22.00
" " 72, Angle, " "	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75	15.75	22.00
" " 71, Cross, " "	1.70	2.00	2.25	2.50	3.25	4.75	6.25	9.50	20.00	27.50
" " 70, Globe, Flanged, "	....	4.00	4.00	5.00	6.00	9.00	11.00	16.50	25.00	34.00
" " 69, Angle, " "	....	4.00	4.00	5.00	6.00	9.00	11.00	16.50	25.00	34.00
" " 68, Cross, " "	....	6.50	7.00	8.00	9.00	12.00	15.00	23.00	33.00	44.00

EXTRA HEAVY PATTERN

Screw Ends for Working Pressures up to 300 pounds; with B-X Flange Ends for 250 pounds

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, No. 16, Globe, Scrd., each	1.60	1.70	2.50	3.80	4.90	6.50	9.00	14.00	25.00	36.00
" " 17, Angle, " "	1.60	1.70	2.50	3.80	4.90	6.50	9.00	14.00	25.00	36.00
" " 18, Cross, " "	2.10	2.30	3.40	4.60	6.00	7.80	10.50	16.00	29.00	42.00
" " 19, Globe, Flgd., "	....	7.00	7.50	10.00	12.00	16.00	23.50	34.00	48.00	68.00
" " 20, Angle, " "	....	7.00	7.50	10.00	12.00	16.00	23.50	34.00	48.00	68.00
" " 21, Cross, " "	....	10.50	11.00	15.00	17.00	22.00	32.00	43.00	63.00	88.00

LUNKENHEIMER REGRINDING BRONZE CHECK VALVES

MEDIUM PATTERN

Screw Ends for Working Pressures up to 200 Pounds; with B-H Flange Ends for Working Pressures up to 150 Pounds

No. 414, HORIZONTAL

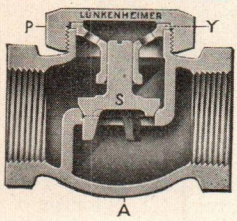


Fig. 23059A

No. 415, ANGLE

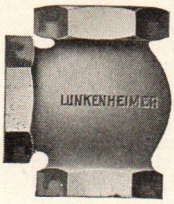


Fig. 23059B

No. 418, VERTICAL

Fig. 23059C

Size.....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price, Screwed, each	.50	.50	.60	.85	1.15	1.55	2.30	3.25	5.20	10.00	14.00	19.75	30.75
" Flanged "	...	...	1.90	3.00	4.30	5.20	7.30	9.70	13.30	18.20	25.80	32.90	46.00

EXTRA HEAVY PATTERN

Screw Ends for Working Pressures up to 300 Pounds; with B-X Flange Ends for Working Pressures up to 250 Pounds

No. 413, HORIZONTAL

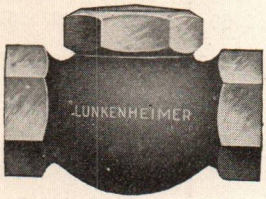


Fig. 23059D

No. 621, ANGLE

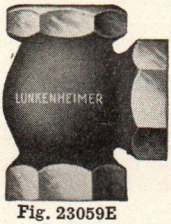


Fig. 23059E

No. 622, VERTICAL

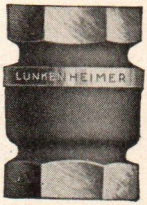


Fig. 23059F

Size.....inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price, Screwed, ea.	.90	1.00	1.20	1.70	2.80	3.90	5.50	8.90	16.20	24.30	35.40	45.20
" Flanged "	...	6.10	7.60	9.10	11.50	14.00	20.00	26.50	40.00	56.00	81.00	110.00

BALL CHECK VALVES—MEDIUM PATTERN

Screw Ends for Working Pressures up to 200 Pounds

No. 416, HORIZONTAL

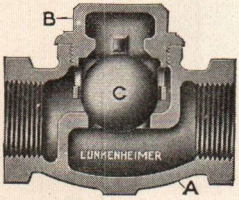


Fig. 23059G

No. 739, ANGLE

Fig. 23059H

No. 740, VERTICAL

Fig. 23059J

Size....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price.....each	.85	.95	1.10	1.60	2.30	3.50	5.30	7.50	11.50	18.00	27.00

LUNKENHEIMER CHECK VALVES

RENEWO CHECK VALVES

HORIZONTAL

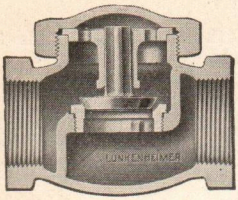


Fig. 22994A

ANGLE

Fig. 22994B

Originally, the Renewo was confined to valves of the globe, angle and cross patterns. The construction, however, appealed to the trade to a degree fully warranting an extension of the line—hence the addition of horizontal and angle check valves. The addition of the renewable seat feature not only makes possible the renewal of this part when worn beyond repairing by means of regrinding, but enables its being made of Lunkenheimer durable nickel alloy, a material the same as that of the disc, and unequaled for severe service.

The long center guide insures perfect seating of the disc, and holds it in position while regrinding. Made in medium pattern with screw ends, for working steam pressures up to 200 pounds, and with B-H flange ends for pressures up to 150 pounds; extra heavy pattern, screw ends for 300 pounds pressure, and with B-X flange ends for 250 pounds pressure. Horizontal and angle types in sizes ¼ to 3 inches, inclusive.

Size ..... inches	¼	⅜	½	¾	1
Hor. or Angle, Med. Pattern, Screw Ends.... each	1.10	1.20	1.30	1.90	2.60
" " " " " with B-H Flange Ends..... each	....	2.60	3.30	4.40	5.60
Hor. or Angle, Ex. Heavy Pattern, Screw Ends ..... each	1.70	1.80	2.00	2.90	3.90
Hor. or Angle, Extra Heavy Pattern, with B-X Flange Ends..... each	....	5.00	6.00	8.50	10.00
Size..... inches	1¼	1½	2	2½	3
Hor. or Angle, Med. Pattern, Screw Ends.... each	3.80	5.00	8.30	14.00	21.00
" " " " " with B-H Flange Ends..... each	7.80	10.00	15.00	22.00	28.00
Hor. or Angle, Ex. Heavy Pattern, Screw Ends ..... each	5.70	7.50	12.50	21.00	32.00
Hor. or Angle, Ex. Heavy Pattern, with B-X Flange Ends..... each	14.00	19.00	30.00	45.00	60.00

REGRINDING SWING CHECK VALVES

No. 554, SCREWED
For Working Pressures up to 200 Pounds

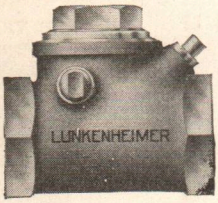


Fig. 22994C

No. 624 EXTRA HEAVY
For Working Pressures up to 300 Pounds

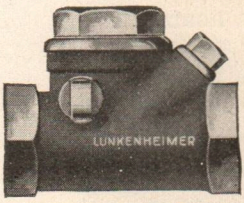


Fig. 22994D

Size..... inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, No. 554..... each	1.25	1.25	1.30	1.75	2.25	3.25	4.25	6.25	11.50	16.00
" " 624..... "	2.00	2.10	2.20	2.90	4.00	5.60	7.50	11.00	18.30	28.30

Made also with screw and flange, and flanged ends.

WILLIAMS REGRINDING BRASS VALVES

UNION BONNET **INSIDE SCREW STEM** **SCREW ENDS**

Medium Pattern, for Working Pressure up to 200 Pounds
Extra Heavy Pattern, for Working Pressure up to 350 Pounds

GLOBE

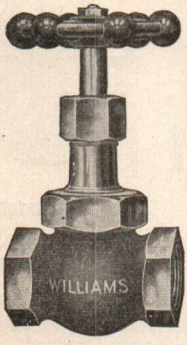


Fig. 4461A

ANGLE

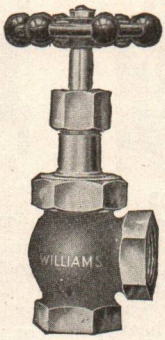


Fig. 4461B

CROSS

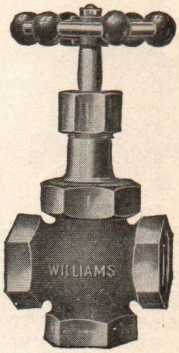


Fig. 4461C

Can be easily repacked under pressure without danger and are easily reground. They are of the inside screw, type with union bonnet ring. Hexagon rings are regularly furnished on all sizes up to and including 3-inch. Can be had with British standard pipe threads without additional cost.

MEDIUM PATTERN GLOBE, ANGLE, AND CROSS VALVES—SCREWED

Size.....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Globe and Angle..each	.70	.70	.85	1.15	1.45	2.00	2.80	3.90	6.20	12.00	16.50
" Cross..... "	1.00	1.00	1.00	1.50	2.00	2.70	3.50	5.10	8.00	16.00	24.00

MEDIUM PATTERN GLOBE, ANGLE, AND CROSS VALVES—FLANGED

Size.....inches	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Globe and Angle.....each	2.20	3.40	4.70	5.80	8.00	11.00	14.50	21.00	29.00
" Cross..... "	3.20	5.10	7.00	8.40	12.00	15.00	20.50	29.00	40.00

EXTRA HEAVY GLOBE, ANGLE, AND CROSS VALVES—SCREWED

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Globe and Angle...each	.90	1.10	1.50	2.30	3.60	5.10	7.10	10.90	19.50	29.00
" Cross..... "	1.20	1.30	1.90	2.90	4.50	6.30	8.60	13.10	23.40	34.50

EXTRA HEAVY GLOBE, ANGLE, AND CROSS VALVES—FLANGED

Size.....inches	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Globe and Angle...each	2.50	4.10	5.80	7.60	11.00	14.00	20.00	32.00	44.00
" Cross..... "	3.50	5.90	8.20	10.50	14.50	19.00	27.00	43.00	57.00

WILLIAMS BRASS REGRINDING VALVES

FLANGED YOKE WITH OUTSIDE SCREW AND STEM

SCREWED ENDS

CROSS GLOBE

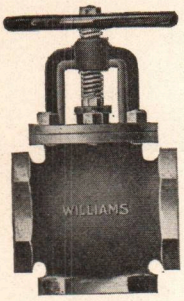


Fig. 26395A

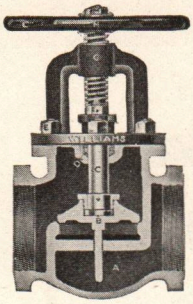


Fig. 26395B

For working pressures: Medium pattern, up to 200 pounds; extra heavy pattern, up to 350 pounds.

The body, yoke, stem and disc are all made of the best bronze composition and the whole construction is very heavy, compact and durable.

FLANGED YOKE WITH OUTSIDE SCREW AND STEM

FLANGED ENDS

CROSS GLOBE

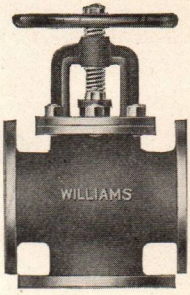


Fig. 26395D

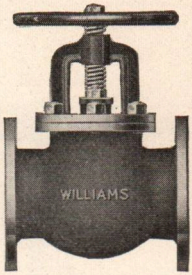


Fig. 26395E

For working pressures; Medium pattern, up to 200 pounds; extra heavy pattern, up to 350 pounds.

Can be furnished with American Standard extra heavy flanges, male and female, or with companion flanges bolted on, for which a slight additional charge will be made.

ANGLE

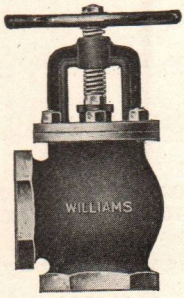


Fig. 26395C

Size Inches	Price, Each, Screwed — Medium — Globe or Angle	Medium — Cross	Extra Heavy — Globe or Angle	Extra Heavy — Cross
1½	12.00	14.00	13.50	17.50
2	15.50	18.00	17.00	20.00
2½	18.00	21.00	24.00	29.00
3	26.00	31.00	34.00	41.00
3½	37.00	44.00	47.00	56.00
4	47.00	56.00	62.00	73.00
4½	59.00	69.00	77.00	90.00
5	75.00	88.00	98.00	115.00
6	100.00	115.00	125.00	150.00
7	150.00	170.00	180.00	210.00
8	205.00	240.00	255.00	295.00

ANGLE

Fig. 26395F

Size Inches	Price, Each, Flanged — Medium — Globe or Angle	Medium — Cross	Extra Heavy — Globe or Angle	Extra Heavy — Cross
1½	13.50	17.50	22.00	29.00
2	17.00	20.00	28.00	34.00
2½	24.00	29.00	40.00	44.00
3	34.00	41.00	44.00	59.00
3½	47.00	56.00	63.00	75.00
4	62.00	73.00	80.00	95.00
4½	77.00	90.00	97.00	115.00
5	98.00	115.00	120.00	140.00
6	125.00	150.00	150.00	175.00
7	180.00	210.00	205.00	240.00
8	255.00	295.00	280.00	325.00

WILLIAMS REGRINDING BRASS CHECK VALVES

Medium Pattern, for Working Pressure up to 200 pounds
Extra Heavy Pattern, for Working Pressure up to 350 pounds

HORIZONTAL

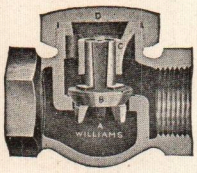


Fig. 11269A

SWINGING

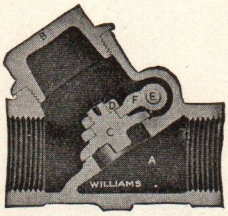


Fig. 11269B

BALL

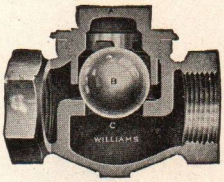


Fig. 11269C

HORIZONTAL, ANGLE AND VERTICAL CHECK VALVES—SCREWED

Size ..... inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Rough..... each	.50	.50	.60	.85	1.15	1.55	2.30	3.25	5.20	10.00	14.00
Finished ..... "	.75	.75	.90	1.30	1.75	2.40	3.50	5.00	7.80	12.50	17.50
*With Enlarged Seat... "	...	...	....	1.15	1.55	2.30	3.25	5.20	10.00	.....	.....
Add for Drain Cock.... "	...	...	.45	.45	.45	.45	.45	.45	.45	.50	.50

*Horizontal and Angle only.

HORIZONTAL, ANGLE AND VERTICAL CHECK VALVES—FLANGED

Size ..... inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price..... each	1.90	3.00	4.30	5.20	7.30	9.70	13.30	18.20	25.80

EXTRA HEAVY HORIZONTAL, ANGLE AND VERTICAL CHECK VALVES

Size ..... inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Screwed ..... each	.70	.70	1.00	1.70	2.80	3.90	5.50	8.90	16.20	24.30
" Flanged ..... "	...	2.20	3.70	5.20	6.80	9.40	12.70	18.10	29.00	39.10

SWING CHECK VALVES

Size ..... inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Screwed .... each	1.25	1.25	1.30	1.75	2.25	3.25	4.25	6.25	11.50	16.00
" Flanged .... "	....	2.60	2.90	3.60	4.90	7.20	9.20	12.30	18.50	26.80

EXTRA HEAVY SWING CHECK VALVES

Size ..... inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price, Screwed .... each	2.00	2.10	2.20	2.90	4.00	5.60	7.50	11.00	18.30	28.30
" Flanged .... "	....	3.40	4.00	4.90	6.60	9.50	12.50	16.80	25.30	37.00

HORIZONTAL, ANGLE AND VERTICAL BALL CHECK VALVES—SCREWED

Size..... inches	1/8	1/4	3/8	1/2	3/4	1
Price..... each	.85	.95	1.10	1.60	2.30	3.10
" Horizontal, with Drain Cock.. "	...	...	1.50	2.00	2.70	3.50

Size..... inches	1 1/4	1 1/2	2	2 1/2	3	....
Price..... each	4.00	6.20	9.40	18.00	25.00	....
" Horizontal, with Drain Cock.. "	4.40	6.60	9.80	18.50	25.50	....

WILLIAMS BRASS DOUBLE DISC GATE VALVES

UNION BONNET AND INSIDE SCREW STEM

SCREWED

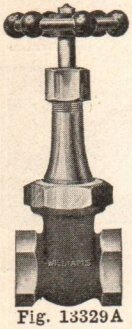


Fig. 13329A

SECTIONAL

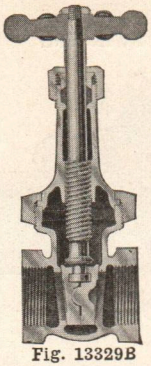


Fig. 13329B

FLANGED

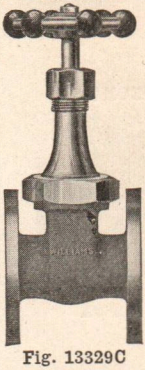


Fig. 13329C

Above are shown several types of Williams Double Disc Gate Valves, which are alike in their interior construction, but which differ in the form of their pipe connecting ends.

The medium pattern is guaranteed for 200 and extra heavy pattern for 350 pounds working pressure. If desired, British instead of American Standard Pipe Threads can be furnished without extra charge. If plain brass or Navy Standard wheels are desired, add to the net price of the valve the net cost of wheels.

NOTE.—An extra charge will be made for valves ordered with British or Navy Standard, male and female flanges, or with flanges of different dimensions than the regular standard.

MEDIUM

Size ..... inches	¼	⅜	½	¾	1
Price, Screwed Ends ..... each	1.10	1.10	1.30	1.90	2.50
" Flanged " ..... "	....	2.60	3.00	4.00	5.30
" Screwed and Flanged ..... "	....	2.00	2.40	3.10	4.20
Size ..... inches	1¼	1½	2	2½	3
Price, Screwed Ends ..... each	3.50	5.00	7.50	14.00	20.00
" Flanged " ..... "	7.70	10.50	14.00	21.00	32.00
" Screwed and Flanged ..... "	5.90	8.20	11.20	18.00	27.00

EXTRA HEAVY

Size ..... inches	¼	⅜	½	¾	1
Price, Screwed Ends ..... each	1.90	1.90	2.20	3.10	4.40
" Flanged " ..... "	....	3.50	4.20	5.50	7.50
" Screwed and Flanged .... "	....	2.80	3.30	4.50	6.20
*Add to List for Finishing and Polishing with Wood Wheel ..... each	1.20	1.20	1.30	1.40	2.00
*Add to List for Finishing and Polishing with Brass Wheel ..... each	1.90	1.90	1.90	2.10	2.80
Size ..... inches	1¼	1½	2	2½	3
Price, Screwed Ends ..... each	6.00	8.90	12.80	21.00	34.00
" Flanged " ..... "	10.50	14.50	19.40	29.00	44.00
" Screwed and Flanged .... "	8.60	12.10	16.50	25.20	40.00
*Add to List for Finishing and Polishing with Wood Wheel .... each	2.50	2.50	4.50	.....	.....
*Add to List for Finishing and Polishing with Brass Wheel ..... each	3.30	3.40	5.50	.....	.....

*For medium and extra heavy.

BRASS HOSE VALVES

STANDARD PATTERN

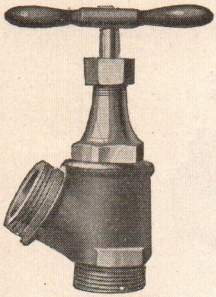


Fig. 7576A

GARDEN HOSE VALVES

ANGLE OPENING

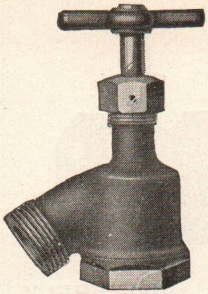


Fig. 7576B

STRAIGHT OPENING

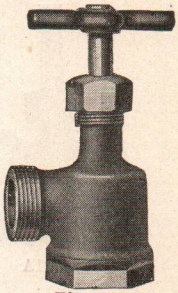


Fig. 7576C

Standard pattern valves have more clearance than the garden hose valves. The hose end of these valves in sizes from 1 to 2 inches, inclusive, are all fitted with the Chicago Standard hose thread. The 2½-inch is fitted with the Chicago Fire Department hose thread. If a different thread is required it will be necessary to send us a sample thread, preferably the male end of a hose coupling. An extra charge will be made for special hose thread other than those specified. When so ordered we will furnish these valves with iron pipe thread, both ends, at regular prices.

No. 50 STANDARD PATTERN

IRON HANDLE, LOOSE SWIVEL AND LEATHER DISC

Size ..... inches	1	1¼	1½	2	2½
Price, Rough Body, Plain ..... each	**3.15**	**3.70**	**4.75**	**7.00**	**8.50**
" " " Nickel-plated All Over.. "	**3.65**	**4.30**	**5.50**	**8.00**	**9.75**

No. 52 STANDARD PATTERN

FINISHED BRASS WHEEL, LOOSE SWIVEL AND LEATHER DISC

Size ..... inches	1½	2	2½
Price, Finished All Over ..... each	**9.00**	**11.50**	**14.50**
" " and Nickel-plated All Over..... "	**10.00**	**12.75**	**16.00**

No. 52 valves are made to order only.

GARDEN HOSE VALVES

ANGLE OPENING

Size ..... inches	½	¾	1	1¼	1½	2	2½
Price ..... each	**1.65**	**1.65**	**2.20**	**3.40**	**4.75**	**7.00**	**15.00**

GARDEN HOSE VALVES

STRAIGHT OPENING

Size ..... inches	½	¾	1	1¼	1½	2	2½
Price ..... each	**1.65**	**1.65**	**2.20**	**3.40**	**4.75**	**7.00**	**15.00**

Garden hose valves will be furnished with Chicago hose thread, California hose thread, or iron pipe thread at regular prices. Any other style thread will be extra. In ordering, always specify the thread required.

BUTTERFLY AND THROTTLE VALVES

STANDARD

BUTTERFLY

BRASS

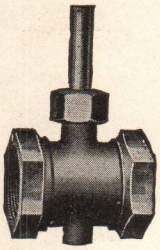


Fig. 611A

IRON BODY

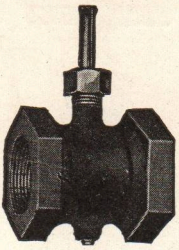


Fig. 611B

THROTTLE

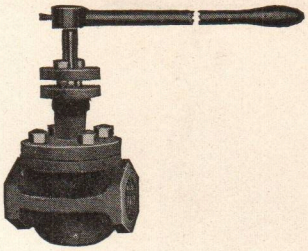


Fig. 611C

BUTTERFLY

Size.....inches	¾	1	1¼	1½	2	2½
Price, Brass, Screwed.....each	3.10	4.40	5.65	6.75	10.00	13.75
" Iron Body, Screwed.... "	....	....	6.35	7.00	8.00	9.50
" " " Flanged.... "	....	....	7.50	8.50	9.50	11.50
Size.....inches	3	3½	4	5	6	..
Price, Brass, Screwed.....each	21.00	....	....	....	....	....
" Iron Body, Screwed.... "	12.00	16.00	18.50	28.50	42.50	....
" " " Flanged.... "	15.00	19.00	22.00	32.00	47.00	....

THROTTLE

Size.....inches	¾	1	1¼	1½	2	2½	3	3½	4
Price, Brass, Scrd, each	10.00	11.50	14.00	20.00	25.00	35.00	....	....	....
" Iron Body " "	....	....	....	....	22.50	30.00	40.00	50.00	60.00

LEVER THROTTLE BRONZE

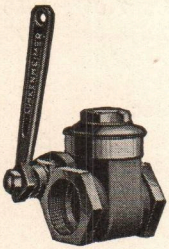


Fig. 611D

BRONZE MOUNTED

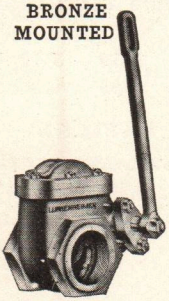


Fig. 611E

HANDY GATE BRONZE

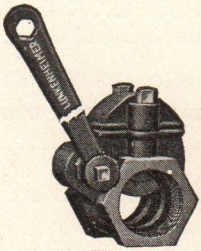


Fig. 611F

BRONZE MOUNTED

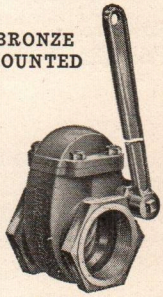


Fig. 611G

LEVER THROTTLE

Size.....inches	½	¾	1	1¼	1½	2
Price, Bronze.....each	2.50	3.00	4.00	5.00	7.00	10.00
" Iron Body..... "	....	....	....	....	....	8.50
Size.....inches	2½	3	3½	4	5	6
Price, Bronze.....each	19.00	....	....	....	....	....
" Iron Body..... "	16.00	20.00	25.00	30.00	35.00	40.00

HANDY GATE

Size.....inches	½	¾	1	1¼	1½	2	2½
Price, Bronze.....each	1.60	1.80	2.50	3.50	5.00	7.50	13.50
" Iron Body..... "	....	....	....	....	....	7.00	12.00
Size.....inches	3	3½	4	4½	5	6	8
Price, Bronze.....each	19.00	40.00	60.00	....	....	....	....
" Iron Body..... "	15.00	18.00	21.00	25.00	30.00	42.00	90.00

For working pressure not to exceed 75 pounds.

BRASS GATE VALVES

STANDARD

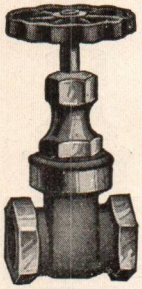


Fig. 4836A

QUICK OPENING

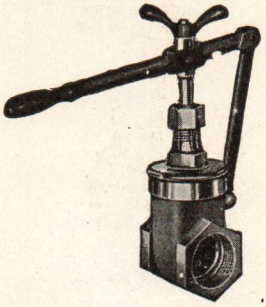


Fig. 4836B

HOSE

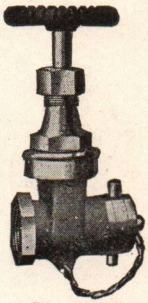


Fig. 4836C

STANDARD—SCREWED

Size.....inches	¼	⅜	½	¾	1	1¼	1½
Price.....each	1.45	1.45	1.65	2.05	2.80	3.70	5.00
Size.....inches	2	2½	3	*3½	*4	*5	*6
Price.....each	7.30	13.00	19.00	43.00	58.00	110.00	165.00

STANDARD—FLANGED

Size .....inches	2	2½	3	*3½	*4	*5	*6
Diameter of Flanges "	6	7	7½	8½	9	10	11
Face to Face..... "	5 1/16	6	6 15/16	6¼	7	9¼	10¾
Price.....each	25.00	33.00	39.00	68.00	83.00	135.00	190.00

QUICK OPENING—SCREWED

Size .....inches	¾	1	1¼	1½	2	2½	3
Price .....each	3.60	4.80	6.20	8.50	11.80	20.25	30.00

QUICK OPENING—FLANGED

Size .....inches	2	2½	3
Price .....each	29.50	40.00	50.00

HOSE GATE VALVES, WITH IRON WHEEL

Size.....inches	1	1¼	1½	2	2½	3
Price, with Cap and Chain .....each	5.10	6.70	8.85	12.60	20.00	29.50
" without Cap and Chain.... "	3.35	4.70	6.25	9.00	15.00	22.00

HOSE GATE VALVES, WITH FINISHED BRASS WHEEL

Size.....inches	1	1¼	1½	2	2½	3
Price, with Cap and Chain .....each	8.65	11.10	14.45	20.90	31.00	45.50
" without Cap and Chain ... "	6.90	9.10	11.85	17.30	26.00	38.00
" with Cap and Chain Plated "	9.25	11.80	15.25	21.90	32.25	47.25
" without Cap and Chain Plated..... "	7.50	9.80	12.65	18.30	27.25	39.75

*NOTE.—3½ to 6-inch standard gate valves have flanged bonnet, non-rising stems and are made on order only.

Hose valves have standard iron pipe thread on female end and hose thread on male end. When ordering, send sample hose thread.

GATE VALVES

JENKINS BROS. BRASS GATE VALVES

STANDARD

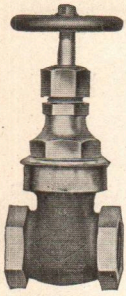


Fig. 23746A

MEDIUM

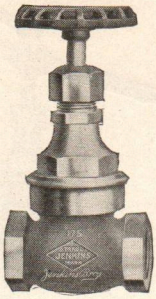


Fig. 23746B

EXTRA HEAVY

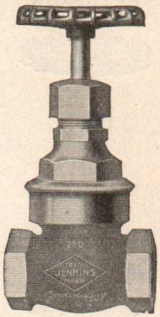


Fig. 23746C

STANDARD—For 125 Pounds Working Pressure and 175 Pounds Water Pressure

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Screwed.....each	1.45	1.45	1.65	2.05	2.80	3.70	5.00	7.30	13.00	19.00
" Flanged....."	....	....	....	9.00	10.25	12.00	15.00	25.00	33.00	39.00

MEDIUM PRESSURE—For 175 Pounds Working Pressure

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Screwed.....each	2.35	2.35	2.75	3.25	4.50	6. 00	8.00	13.00	20.00	32.50
" Flanged..... "	....	....	....	10.25	12.50	16.25	21.50	31.00	45.00	67.50

EXTRA HEAVY—For 250 Pounds Working Pressure

Size.....inches	½	¾	1	1¼	1½	2	2½	3
Price, Screwed.....each	5.00	6.00	8.00	11.25	16.50	23.00	40.00	65.00
" Flanged..... "	....	13.00	16.00	21.50	30.00	41.00	65.00	100.00
" O. S. & Y., Scrd..... "	....	11.50	13.75	17.25	23.50	32.00	52.00	74.50
" O. S. & Y., Flgd..... "	....	.....	21.00	27.00	35.50	48.00	76.00	111.00

CHAPMAN BRONZE GATE VALVES

STANDARD
For 125 Pounds Working Pressure
SCREWED

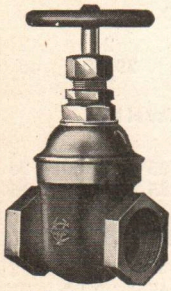


Fig. 23746D

EXTRA HEAVY
For 250 Pounds Working Pressure
SCREWED

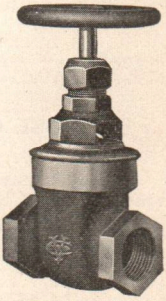


Fig. 23746E

STANDARD—For 125 Pounds Working Pressure

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price.....each	1.45	1.45	1.65	2.05	2.80	3.70	5.00	7.30	13.00	19.00

EXTRA HEAVY—For 250 Pounds Working Pressure

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½
Price.....each	3.50	3.50	3.85	5.20	6.35	8.00	10.30	15.20	22.75

LUNKENHEIMER BRONZE GATE VALVES

MEDIUM PATTERN

DOUBLE DISC
For Pressures up to 150 Pounds
RISING STEM

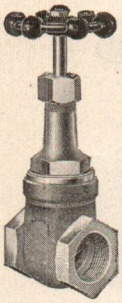


Fig. 24164A

WEDGE DISC
For Pressures up to 200 Pounds
STATIONARY STEM

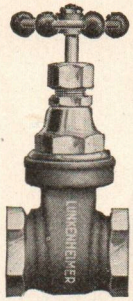


Fig. 24164B

RISING STEM, OUTSIDE SCREW AND YOKE

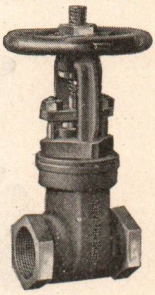


Fig. 24164C

DOUBLE DISC, RISING STEM

The stuffing boxes can be packed when the valve is wide open and under pressure, as a shoulder on the stem directly above the threads forms a seat beneath the stuffing box.

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Screwed..each	1.10	1.10	1.30	1.90	2.50	3.50	5.00	7.50	14.00	20.00

WEDGE DISC, STATIONARY STEM

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Screwed..each	1.70	1.70	1.80	2.30	3.00	4.20	6.00	9.00	17.00	24.00

WEDGE DISC, OUTSIDE SCREW AND YOKE

Size.....inches	¾	1	1¼	1½	2	2½	3
Price, Screwed..each	3.50	5.50	6.30	9.00	14.00	21.00	31.00

WEDGE DISC, EXTRA HEAVY PATTERN

For Pressures up to 300 Pounds

STATIONARY STEM

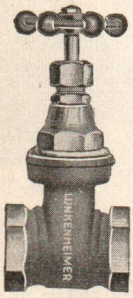


Fig. 24164D

RISING STEM
OUTSIDE SCREW AND YOKE

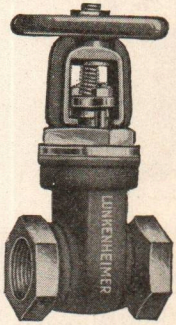


Fig. 24164E

WEDGE DISC, STATIONARY STEM

Size.....inches	½	¾	1	1¼	1½	2	2½	3
Price, Screwed..each	3.90	5.20	6.40	8.00	10.50	15.20	23.00	33.00

WEDGE DISC, OUTSIDE SCREW AND YOKE

Size.....inches	1	1¼	1½	2	2½	3
Price, Screwed..each	8.25	11.50	13.00	18.00	30.00	40.00

STANDARD IRON BODY VALVES

WITH BRASS DISC
BRASS MOUNTED

For Steam working Pressures up to 125 Pounds

GLOBE

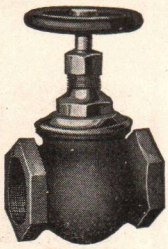


Fig. 749A

ANGLE

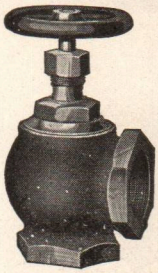


Fig. 749B

Size ..... inches	2	2½	3
Price, Globe or Angle, Screwed ..... each	5.40	7.35	9.80
" " " " Flanged ..... "	7.00	9.00	12.50
" Cross, Screwed ..... "	6.50	9.00	12.50
" " Flanged ..... "	9.00	11.75	16.50

WITH YOKE

GLOBE

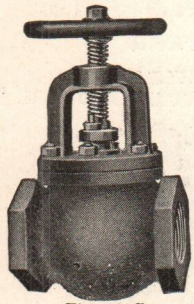


Fig. 749C

ANGLE

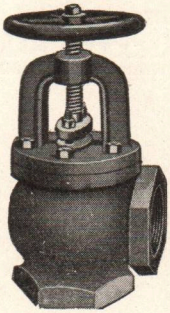


Fig. 749D

CROSS

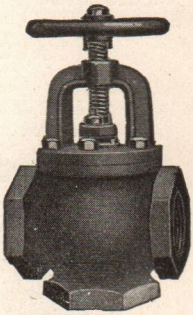


Fig. 749E

Size ..... inches	2	2½	3	3½	4	4½	5	6
Price, Globe or Angle, Screwed. each	7.00	9.00	12.50	15.25	19.00	24.00	27.00	37.50
" " " " Flanged. "	8.60	10.75	15.00	18.50	22.50	27.50	31.00	42.00
" Cross, Screwed ..... "	....	.....	16.25	20.00	23.50	30.65	35.25	47.25
" " Flanged ..... "	....	.....	20.00	25.00	28.50	36.00	41.00	54.00

Size ..... inches	7	8	10	12	14	15	16	.....
Price, Globe or Angle, Screwed. each	63.00	72.00	114.00	170.00	.....	.....	.....	.....
" " " " Flanged. "	68.00	77.00	123.00	187.00	350.00	.....	475.00	.....
" Cross, Screwed ..... "	78.00	92.00	162.00	240.00	.....	.....	.....	.....
" " Flanged ..... "	85.00	100.00	175.00	265.00	.....	.....	.....	.....

STANDARD IRON BODY VALVES

WITH JENKINS DISC

BRASS MOUNTED

For Steam Working Pressures up to 125 Pounds

GLOBE

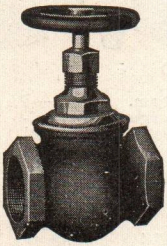


Fig. 10775A

ANGLE

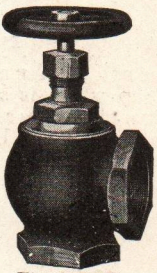


Fig. 10775B

Size.....inches	2	2½	3
Price, Globe or Angle, Screwed.....each	7.25	11.00	16.00
" " " " Flanged..... "	8.50	13.00	18.00

WITH YOKE

GLOBE

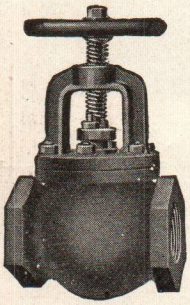


Fig. 10775C

ANGLE

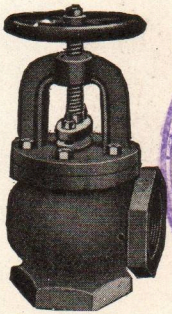


Fig. 10775D

CONSEJO DE MINERIA

Size.....inches	2½	3	3½	4	4½	5
Diameter of Flanges..... "	7	7½	8½	9	9¼	10
Price, Globe or Angle, Screwed.....each	12.00	16.75	19.50	24.00	32.00	40.00
" " " " Flanged..... "	14.00	18.50	21.50	26.00	34.00	42.00
Size.....inches	6	7	8	10	12	....
Diameter of Flanges..... "	11	12½	13½	16	19	....
Price, Globe or Angle, Screwed.....each	48.00	80.00	90.00	130.00	185.00	....
" " " " Flanged..... "	50.00	80.00	90.00	130.00	185.00	....

STANDARD IRON BODY CHECK VALVES

For Working Pressures up to 125 Pounds

SCREWED ENDS

HORIZONTAL

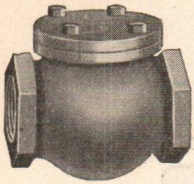


Fig. 761A

VERTICAL

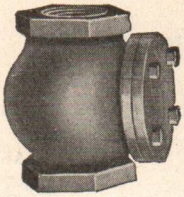


Fig. 761B

Sizes 3 inches and smaller are furnished with a brass cap which is screwed into the body. Sizes 3½ inches and larger are furnished with an iron cap bolted to the body. All vertical valves furnished with bolted cap.

Size Inches	Price, Each Horizontal	Price, Each Vertical
2	3.60	.....
2½	6.50	9.50
3	8.90	12.50
3½	12.25	17.00
4	14.25	21.00
4½	19.00	30.00
5	22.00	33.00
6	30.00	40.00

SWING CHECK VALVES

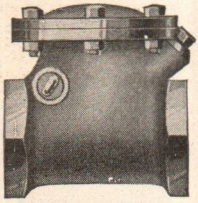


Fig. 761C

With brass or leather disc.

Size Inches	Price, Each Brass Disc	Price, Each Leather Disc
2	11.00	12.00
2½	12.00	13.50
3	13.50	15.50
3½	17.50	20.00
4	20.00	23.00
5	30.00	34.00
6	36.00	40.00
7	55.00	61.00
8	70.00	77.50
10	110.00	120.00
12	160.00	172.00

FLANGED ENDS

HORIZONTAL

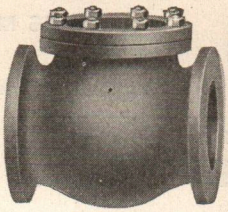


Fig. 761D

VERTICAL

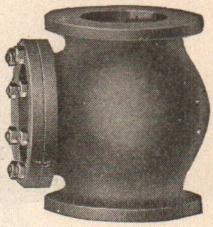


Fig. 761E

Size Inches	Diam. Flanges Inches	Price, Each Horizontal	Price, Each Vertical
3	7½	11.50	.....
4	9	18.00	.....
5	10	26.00	.....
6	11	35.00	45.00
7	12½	50.00	67.00
8	13½	62.00	78.00
10	16	115.00	135.00
12	19	175.00	.....
14	21	300.00	.....
15	22¼	.....	.....

SWING CHECK VALVES

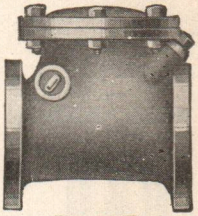


Fig. 761F

Sizes above 16-inch for working pressures up to 100 pounds.

Size Inches	Price, Each Brass Disc	Price, Each Leather Disc	Size Inches	Price Brass Disc Each
3	17.00	19.00	12	168.00
3½	21.00	23.50	14	340.00
4	24.00	27.00	15	400.00
4½	30.00	33.50	16	450.00
5	34.00	38.00	18	600.00
6	41.00	45.00	20	700.00
7	60.00	66.00	24	1000.00
8	75.00	82.50	30	1650.00
10	115.00	125.00	..	.....

Prices of hub end valves quoted upon application. Valves with by-pass on special order.

JENKINS IRON BODY VALVES

BRASS MOUNTED

Standard Pattern, for 125 Pounds Working Steam Pressure, or 175 Pounds Working Water Pressure

GLOBE, SCREWED

Fig. 4833A

GLOBE, FLANGED

Fig. 4833B

ANGLE, SCREWED

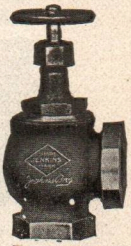


Fig. 4833C

Size.....inches	½	¾	1	1¼	1½	2	2½	3
Price, Globe or Angle, Screwed.....each	2.80	2.80	3.00	4.00	5.00	7.25	11.00	16 00
" " " " Flanged..... "	3.80	3.80	4.40	5.40	6.60	8.50	13.00	18.00

WITH YOKE

For 150 Pounds Working Steam Pressure, or 250 Pounds Working Water Pressure

GLOBE

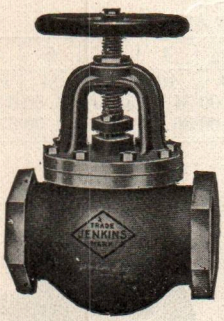


Fig. 4833D

ANGLE

Fig. 4833E

CROSS

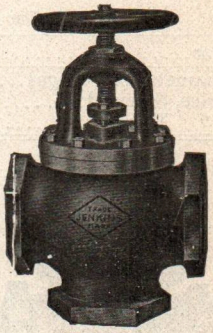


Fig. 4833F

SCREWED

Size.....inches	2	2½	3	3½	4	4½	5
Price, Globe.....each	10.00	12.00	16.75	19.50	24.00	32.00	40.00
" Angle..... "	10.00	12.00	16.75	19.50	24.00	32.00	40.00
" Cross..... "	.....	16.00	21.00	26.00	30.00	42.00	45.00

Size.....inches	6	7	8	9	10	12	.....
Price, Globe.....each	48.00	80.00	90.00	121.00	130.00	185.00	.....
" Angle..... "	48.00	80.00	90.00	121.00	130.00	185.00	.....
" Cross..... "	58.00	90.00	100.00	.....	.....	.....	.....

FLANGED

Size.....inches	2	2½	3	3½	4	4½	5	6	7
Price, Globe or Angle, each	11.75	14.00	18.50	21.50	26.00	34.00	42.00	50.00	80.00
" Cross..... "	.....	19.00	24.00	29.00	33.00	45.00	48.00	62.00	90.00

Size.....inches	8	9	10	12	14	16	18	20	24
Price, Globe or Angle, each	90.00	121.00	130.00	185.00	334.00	400.00	540.00	620.00	1260.00
" Cross..... "	100.00	.....	.....	.....	.....	.....	.....	.....	.....

JENKINS IRON BODY CHECK VALVES

HORIZONTAL, ANGLE AND VERTICAL

HORIZONTAL SCREWED

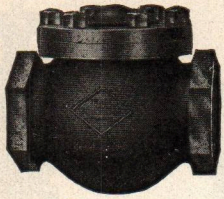


Fig. 6119A

ANGLE SCREWED

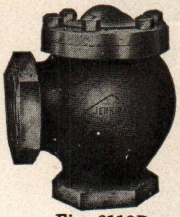


Fig. 6119B

STANDARD PATTERN

For 150 Pounds Working Pressure

Size.....inches	2	2½	3	3½	4	4½	5	6	7	8
Diameter of Flanges....inches	6	7	7½	8½	9	9¼	10	11	12½	13½
Price, Screwed.....each	8.00	11.00	14.00	17.00	20.00	25.00	30.00	40.00	65.00	80.00
" Flanged..... "	10.00	13.00	16.50	20.00	23.00	28.00	33.00	43.00	65.00	80.00

EXTRA HEAVY PATTERN

For 250 Pounds Working Pressure, Horizontal or Angle

Size.....inches	2	2½	3	3½	4	4½	5	6
Diameter of Flanges.....inches	6½	7½	8¼	9	10	10½	11	12½
Price, Screwed.....each	15.00	17.00	21.00	26.00	34.00	38.00	46.00	65.00
" Flanged..... "	16.00	19.00	23.00	28.00	36.00	40.00	48.00	67.00

SWING

STANDARD SCREWED

Fig. 6119C

STANDARD FLANGED

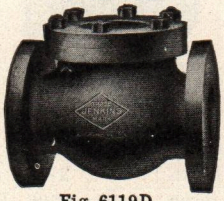


Fig. 6119D

EXTRA HEAVY SCREWED

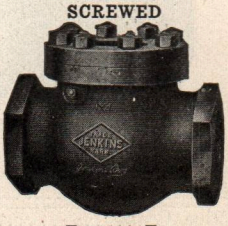


Fig. 6119E

STANDARD PATTERN

For 150 Pounds Working Pressure

Size.....inches	2	2½	3	3½	4	5	6	7	8	10
Diameter of Flanges.inches	6	7	7½	8½	9	10	11	12½	13½	16
Price, Screwed.....each	13.50	13.50	15.50	20.00	23.00	34.00	40.00	61.00	77.50	120.00
" Flanged..... "	.....	16.00	19.00	23.50	27.00	38.00	45.00	66.00	82.50	125.00

EXTRA HEAVY PATTERN

For 250 Pounds Working Pressure

Size.....inches	2	2½	3	4	5	6	8
Diameter of Flanges.....inches	6½	7½	8¼	10	11	12½	15
Price, Screwed.....each	15.00	20.00	28.00	41.00	54.00	66.00	100.00
" Flanged..... "	17.00	22.00	30.00	44.00	57.00	70.00	105.00

LUNKENHEIMER IRON BODY VALVES

For Working Pressures up to 125 Pounds

IRON BODY BRONZE MOUNTED

SCREWED

No. 1120, GLOBE

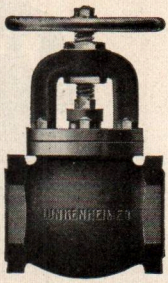


Fig. 4785A

No. 1121, ANGLE

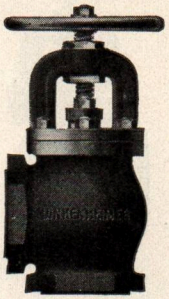


Fig. 4785B

No. 1122, CROSS

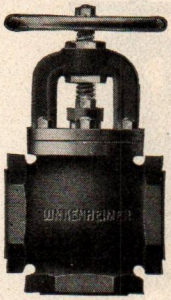


Fig. 4785C

Size.....inches	2	2½	3	3½	4	4½
Price, No. 1120, Globe.....each	11.50	15.00	18.50	24.50	31.00	38.00
" " 1121, Angle..... "	11.50	15.00	18.50	24.50	31.00	38.00
" " 1122, Cross..... "	14.00	18.50	23.50	31.00	38.00	48.00
Size.....inches	5	6	7	8	10	12
Price, No. 1120, Globe.....each	46.00	61.00	90.00	120.00	190.00	280.00
" " 1121, Angle..... "	46.00	61.00	90.00	120.00	190.00	280.00
" " 1122, Cross..... "	58.00	77.00	110.00	145.00	215.00	315.00

FLANGED

No. 1123, GLOBE

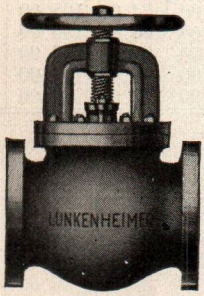


Fig. 4785D

No. 1124, ANGLE

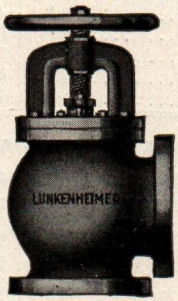


Fig. 4785E

No. 1125, CROSS

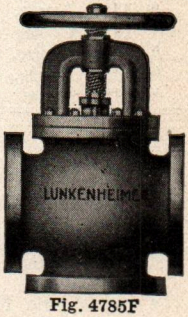


Fig. 4785F

Provided with bronze discs up to and including the 6-inch size, above which the discs are made of iron with bronze rings. Easily reground and packed under pressure.

Size.....inches	2	2½	3	3½	4	4½
Price, No. 1123, Globe.....each	13.00	17.00	21.00	28.00	35.00	43.00
" " 1124, Angle..... "	13.00	17.00	21.00	28.00	35.00	43.00
" " 1125, Cross..... "	17.50	21.50	27.50	36.00	44.00	55.00
Size.....inches	5	6	7	8	10	12
Price, No. 1123, Globe.....each	51.00	66.00	96.00	130.00	190.00	280.00
" " 1124, Angle..... "	51.00	66.00	96.00	130.00	190.00	280.00
" " 1125, Cross..... "	66.00	86.00	120.00	155.00	225.00	330.00

LUNKENHEIMER GLOBE, ANGLE AND CROSS VALVES

IRON BODY BRONZE MOUNTED

No. 1126, GLOBE

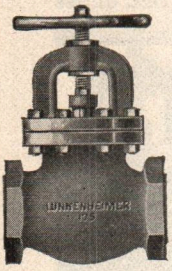


Fig. 4117A

No. 1127, ANGLE

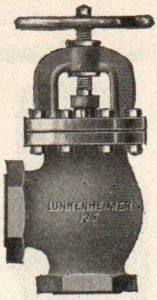


Fig. 4117B

No. 1128, CROSS

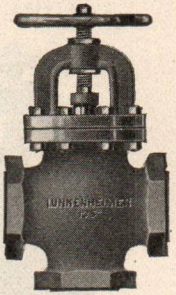


Fig. 4117C

HEAVY PATTERN

For 175 Pounds Working Pressure

Size ..... inches	2	2½	3	3½	4
Price, No. 1126, Globe, Screwed ..... each	14.00	18.00	23.00	30.00	38.00
" " 1127, Angle, " ..... "	14.00	18.00	23.00	30.00	38.00
" " 1128, Cross, " ..... "	18.00	23.50	32.00	40.00	47.00
" " 1129, Globe, Flanged ..... "	16.00	20.50	26.00	34.00	42.00
" " 1130, Angle, " ..... "	16.00	20.50	26.00	34.00	42.00
" " 1131, Cross, " ..... "	23.00	29.50	39.00	50.00	58.00

Size ..... inches	4½	5	6	7	8
Price, No. 1126, Globe, Screwed ..... each	46.00	57.00	74.00	105.00	140.00
" " 1127, Angle, " ..... "	46.00	57.00	74.00	105.00	140.00
" " 1128, Cross, " ..... "	61.00	75.00	100.00	135.00	180.00
" " 1129, Globe, Flanged ..... "	52.00	64.00	81.00	115.00	155.00
" " 1130, Angle, " ..... "	52.00	64.00	81.00	115.00	155.00
" " 1131, Cross, " ..... "	73.00	90.00	115.00	155.00	205.00

EXTRA HEAVY PATTERN

For 250 Pounds Working Pressure

Size ..... inches	2	2½	3	3½	4
Price, No. 881, Globe, Screwed ..... each	29.00	33.00	37.00	46.00	55.00
" " 882, Angle, " ..... "	29.00	33.00	37.00	46.00	55.00
" " 883, Cross, " ..... "	35.00	40.00	45.00	54.00	64.00
" " 884, Globe, Flanged ..... "	31.00	35.00	40.00	51.00	59.00
" " 885, Angle, " ..... "	31.00	35.00	40.00	51.00	59.00
" " 886, Cross, " ..... "	38.00	43.00	50.00	61.00	69.00

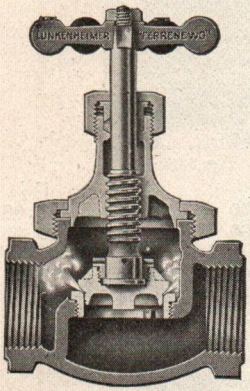
Size ..... inches	4½	5	6	7	8
Price, No. 881, Globe, Screwed ..... each	62.00	75.00	93.00	130.00	175.00
" " 882, Angle, " ..... "	62.00	75.00	93.00	130.00	175.00
" " 883, Cross, " ..... "	72.00	90.00	115.00	155.00	205.00
" " 884, Globe, Flanged ..... "	67.00	78.00	100.00	140.00	185.00
" " 885, Angle, " ..... "	67.00	78.00	100.00	140.00	185.00
" " 886, Cross, " ..... "	78.00	93.00	120.00	165.00	215.00

LUNKENHEIMER FERRENEWO VALVES

IRON BODY BRONZE MOUNTED
SELF-CLEANSING SEAT
REGRINDING AND RENEWABLE SEAT AND DISC

For 150 Pounds Working Pressure

No. 1021
SECTIONAL VIEW



The Ferrenewo has been placed on the market to meet the demand for a valve of the same design as the Renewo, but lower in price. It is a modified Renewo, the difference being in the material used in the body, which is a special iron composition formulated in our factory laboratories particularly for this valve. It is the first formulated to meet the peculiar demands of steam service for small sized valves.

Tensile tests of this iron show that its strength is about 30000 pounds per square inch when the test bar is ½ inch in diameter.

The Ferrenewo retains the renewable nickel seat and disc and all of the other features of design which are so well known in the Renewo Valve.

Every part of the valve is renewable, and this includes the seat and disc—the parts subject to the greatest wear—thereby making the valve practically indestructible.

Attention is called to the seat and disc construction, which provides self-cleansing seating faces.

Reference to the sectional illustration is necessary to thoroughly understand the construction and operation of these parts.

It will be seen that the disc is provided with an annular extension on the bottom, which enters the inside of the seat. Presuming that the valve is under pressure and that this annular extension is just entering the seat ring (the pressure beneath the disc), it will readily be understood that only a slight amount of steam can possibly escape between the extension on the disc and the inside of the seat ring, and as these two surfaces form a fairly close fit, all foreign substances, such as dirt or boiler scale, are prevented from passing, and only a clear, fine spray of steam is permitted to pass between the bearing surfaces which thoroughly cleanses them.

No. 1021, GLOBE

Fig. 8508A

No. 1022, ANGLE

Fig. 8508B

No. 1023, CROSS

Fig. 8508C

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2
Price, No. 1021, Globe, Screwed Ends..each	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75
" " 1022, Angle " " .. "	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75
" " 1023, Cross " " .. "	1.70	2.00	2.25	2.50	3.25	4.75	6.25	9.50

Up to 1½ inches, inclusive, these valves are furnished with hexagon bonnet rings. The 2-inch size has a round slotted ring. The stuffing boxes are provided with gland follower on all sizes above ½ inch.

LUNKENHEIMER IRON BODY CHECK VALVES

BRONZE MOUNTED

STANDARD PATTERN—For 125 Pounds Working Pressure

HORIZONTAL

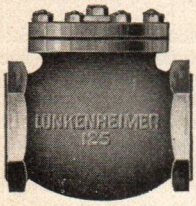


Fig. 23998A

ANGLE

Fig. 23998B

Size.....inches	2	2½	3	3½	4	4½
Price, Screwed.....each	9.00	12.00	14.50	20.50	26.00	33.00
" Flanged..... "	10.50	14.00	17.00	24.00	30.00	38.00
Size.....inches	5	6	7	8	10	12
Price, Screwed.....each	39.00	54.00	83.00	110.00	180.00	270.00
" Flanged..... "	44.00	59.00	89.00	120.00	180.00	270.00

HEAVY PATTERN—For 175 Pounds Working Pressure

HORIZONTAL

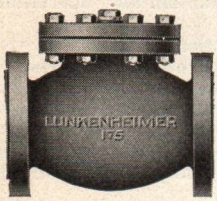


Fig. 23998C

ANGLE

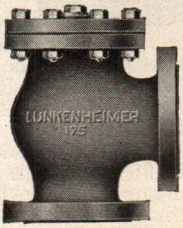


Fig. 23998D

Size.....inches	2	2½	3	3½	4	4½	5	6	7	8
Price, Screwed.ea.	11.50	15.00	19.00	26.00	34.00	42.00	50.00	65.00	95.00	130.00
" Flanged. "	13.50	18.50	22.00	30.00	38.00	46.00	57.00	72.00	105.00	145.00

EXTRA HEAVY PATTERN—For 250 Pounds Working Pressure

HORIZONTAL

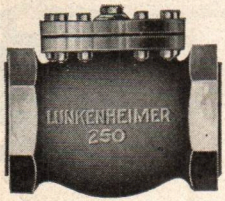


Fig. 23998E

ANGLE

Fig. 23998F

Size.....inches	2	2½	3	3½	4	4½
Price, Screwed.....each	23.00	26.50	29.50	34.00	42.00	47.00
" Flanged..... "	25.00	28.00	32.00	36.00	45.00	50.00
Size.....inches	5	6	7	8	10	12
Price, Screwed.....each	57.00	71.00	96.00	125.00	200.00	260.00
" Flanged..... "	60.00	75.00	100.00	130.00	210.00	300.00

STANDARD IRON BODY GATE VALVES

WEDGE PATTERN

OUTSIDE SCREW AND YOKE

WITH NON-RISING STEM

SCREWED

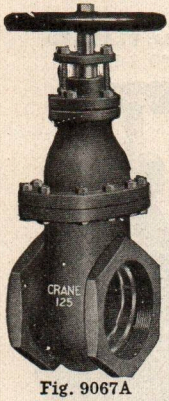


Fig. 9067A

FLANGED

Fig. 9067B

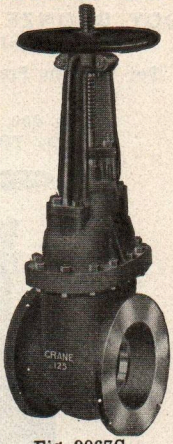


Fig. 9067C

HUB END

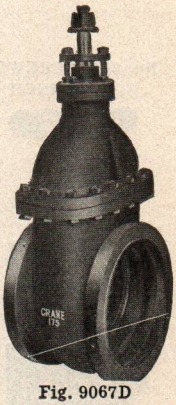


Fig. 9067D

Sizes 16-inch and Smaller, for Steam Working Pressures up to 125 Pounds; Sizes 18-inch and Larger, up to 100 Pounds

WITH NON-RISING STEM

Size ..... inches	2	2½	3	3½	4	4½	5	6
Price, Screwed ..... each	10.00	11.50	14.00	17.00	19.00	24.00	27.50	32.50
" Flanged ..... "	12.00	13.50	16.50	19.50	23.00	28.00	31.50	36.50

Size ..... inches	7	8	9	10	12	14	15	16
Price, Screwed ..... each	45.00	54.00	76.00	90.00	125.00	.....	.....	.....
" Flanged ..... "	49.00	58.00	81.00	95.00	133.00	181.00	220.00	260.00

Size ..... inches	18	20	22	24	26	28	30	.....
Price, Flanged ..... each	350.00	425.00	530.00	600.00	800.00	950.00	1100.00	.....

WITH OUTSIDE SCREW AND YOKE, STEEL STEM

Size ..... inches	2	2½	3	3½	4	4½	5	6
Price, Screwed ..... each	17.50	19.00	22.00	25.00	30.00	37.00	42.00	48.00
" Flanged ..... "	19.50	21.00	24.50	27.50	34.00	41.00	46.00	52.00

Size ..... inches	7	8	9	10	12	14	15	16
Price, Screwed ..... each	64.00	80.00	105.00	122.00	160.00	.....	.....	.....
" Flanged ..... "	68.00	84.00	110.00	127.00	168.00	236.00	285.00	325.00

Size ..... inches	18	20	22	24	26	28	30	.....
Price, Flanged ..... each	435.00	525.00	650.00	725.00	950.00	1125.00	1300.00	.....

HUB END

Sizes 12-inch and Smaller, for Water Working Pressures up to 175 Pounds; Sizes 14 and 16-inch, up to 150 Pounds; Sizes 18-inch and Larger, up to 120 Pounds

Size ..... inches	2	3	4	5	6	7	8	10
End to End ..... inches	8½	9	10¼	10¼	10¾	10¾	12	12¾
Price ..... each	10.00	14.00	19.00	27.50	32.50	45.00	54 00	90.00

Size ..... inches	12	14	16	18	20	24	30	.....
End to End ..... inches	13½	13¾	16	17	17	18	30	.....
Price ..... each	125.00	173.00	250.00	340.00	415.00	590.00	1075.00	.....

LUNKENHEIMER
DOUBLE SEATED "CLIP" GATE VALVES

IRON BODY BRONZE MOUNTED, OR ALL IRON RISING STEM

For Working Pressures up to 100 Pounds

No. 600, SCREWED
½ TO 2-INCH

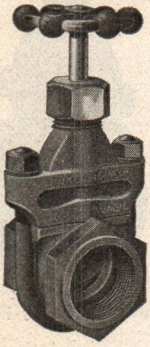


Fig. 2573A

No. 600, SCREWED
2½ TO 6-INCH

Fig. 2573B

No. 638, FLANGED
1 TO 2-INCH

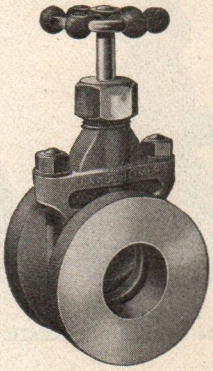


Fig. 2573C

QUICK OPENING

For Working Pressures up to 50 Pounds

No. 639, SCREWED

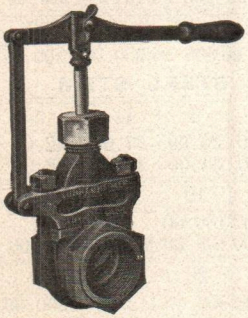


Fig. 2573D

No. 640, FLANGED

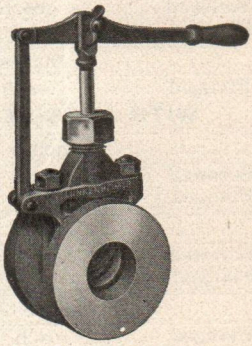


Fig. 2573E

The construction of these valves is simple, durable and compact. The steel clip which extends around the body may be easily removed, allowing free access to the interior of the valve for cleaning or repairing.

Size ..... inches	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price, No. 600, Screwed... each	2.00	2.35	2.50	3.50	5.00	7.50	12.00	15.00	20.00	22.00	26.00	30.00	36.00
" " 638, Flanged... "	....	....	3.00	4.90	6.00	8.50	13.50	16.90	22.00	25.00	29.50	34.00	40.00
" " 639, Screwed... "	2.00	2.35	2.50	3.50	5.00	7.50	12.00	15.00	22.00	24.00	28.50	33.00	40.00
" " 640, Flanged... "	....	....	3.00	4.90	6.00	8.50	13.50	16.90	24.00	27.50	33.00	37.50	44.00

Prices of all iron valves quoted on application.

LUNKENHEIMER
DOUBLE SEATED "VICTOR" GATE VALVES

IRON BODY BRONZE MOUNTED

SPECIAL BRONZE COMPOSITION STEMS

Sizes 2 to 8-inch, for Working Pressures below 125 Pounds

Sizes 10-inch and above, for Working Pressures up to 100 Pounds

STATIONARY STEM

No. 647 SCREWED

No. 648 FLANGED

OUTSIDE SCREW AND YOKE

No. 47 SCREWED

No. 48 FLANGED

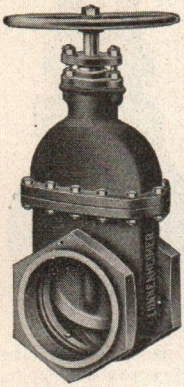


Fig. 1312A

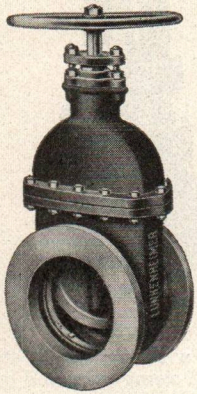


Fig. 1312B

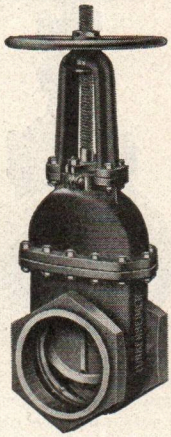


Fig. 1312C

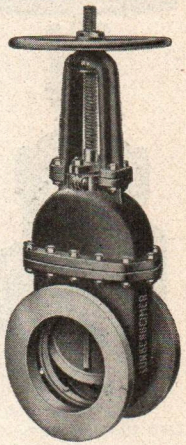


Fig. 1312D

STATIONARY STEM

Size ..... inches	2	2½	3	3½	4	4½	5
Price, No. 647, Screwed ..... each	11.20	14.00	18.00	21.50	26.50	30.00	36.00
" " 648, Flanged ..... "	11.20	14.00	18.00	21.50	26.50	30.00	36.00
Size ..... inches	6	7	8	10	12	14	15
Price, No. 647, Screwed ..... each	43.00	45.00	55.00	94.00	130.00	.....	.....
" " 648, Flanged ..... "	43.00	45.00	55.00	94.00	130.00	150.00	165.00
Size ..... inches	16	18	20	22	24	.....	.....
Price, No. 648, Flanged ..... each	190.00	225.00	300.00	400.00	500.00	.....	.....

OUTSIDE SCREW AND YOKE

Size ..... inches	2	2½	3	3½	4	4½	5
Price, No. 47, Screwed ..... each	13.50	16.50	19.00	26.00	31.00	37.00	42.00
" " 48, Flanged ..... "	13.50	16.50	19.00	26.00	31.00	37.00	42.00
Size ..... inches	6	7	8	10	12	14	15
Price, No. 47, Screwed ..... each	49.00	62.00	80.00	110.00	142.00	.....	.....
" " 48, Flanged ..... "	49.00	62.00	80.00	110.00	142.00	160.00	180.00
Size ..... inches	16	18	20	22	24	.....	.....
Price, No. 48, Flanged ..... each	210.00	240.00	305.00	420.00	505.00	.....	.....

LUNKENHEIMER
DOUBLE SEATED "VICTOR" GATE VALVES

IRON BODY BRONZE MOUNTED
HEAVY PATTERN

For 175 Pounds Working Pressure

STATIONARY STEM
No. 602, SCREWED — No. 603, FLANGED

OUTSIDE SCREW AND YOKE
No. 642, SCREWED — No. 643, FLANGED

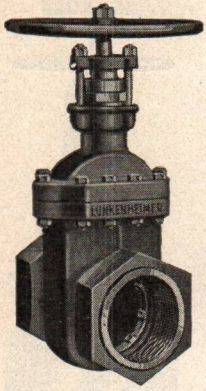


Fig. 10603A

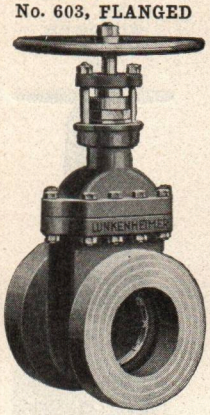


Fig. 10603B

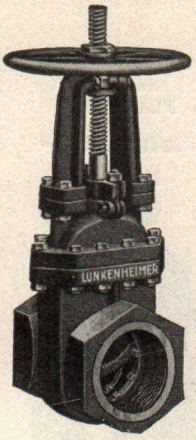


Fig. 10603C

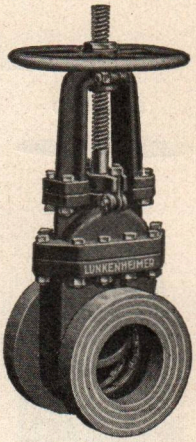


Fig. 10603D

These valves are made in two forms, one with stationary stem, as shown in the two illustrations to the left, and the other with rising stem and outside screw and yoke, as shown in the two illustrations to the right. The latter of these two forms is better adapted for high steam pressures, inasmuch as the threads on the stem are not exposed to the corroding action of the steam, and being accessible for oiling, the life of the valve is therefore prolonged. They are double seated and will take pressure from either end.

STATIONARY STEM

Size.....inches	2	2½	3	3½	4	4½	5
Price, No. 602, Screwed.....each	14.00	17.50	22.50	27.00	33.00	38.00	45.00
" " 603, Flanged..... "	16.00	19.50	25.50	30.00	36.00	41.00	48.00

Size.....inches	6	7	8	9	10	12	14
Price, No. 602, Screwed.....each	53.00	73.00	88.00	100.00	125.00	175.00	.....
" " 603, Flanged..... "	60.00	82.00	93.00	110.00	135.00	185.00	210.00

Size.....inches	15	16	18	20	22	24	.....
Price, No. 603, Flanged.....each	250.00	275.00	315.00	415.00	560.00	675.00	.....

OUTSIDE SCREW AND YOKE

Size.....inches	2	2½	3	3½	4	4½	5
Price, No. 642, Screwed.....each	17.00	20.50	23.50	32.50	39.00	46.50	52.00
" " 643, Flanged..... "	19.00	22.50	26.00	35.50	42.00	49.50	55.00

Size.....inches	6	7	8	9	10	12	14
Price, No. 642, Screwed.....each	61.00	83.00	105.00	122.00	145.00	190.00	.....
" " 643, Flanged..... "	68.00	92.00	110.00	132.00	155.00	200.00	220.00

Size.....inches	15	16	18	20	22	24	.....
Price, No. 643, Flanged.....each	250.00	300.00	330.00	425.00	600.00	700.00	.....

WILLIAMS IRON BODY REGRINDING VALVES

BRASS HUB INSIDE SCREW STEM
BRONZE STEMS

Medium Pattern, for Working Pressure up to 125 Pounds
Heavy Pattern, for Working Pressure up to 175 Pounds

SCREWED

GLOBE

Fig. 15596A

ANGLE

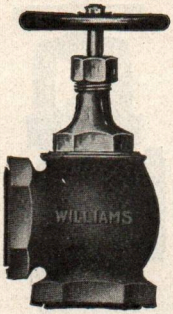


Fig. 15596B

CROSS

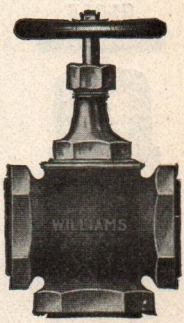


Fig. 15596C

The flanges of these valves are regularly furnished with plain face, but can be tongued and grooved, or companion flanges can be bolted on, if desired, at a slight additional cost. An extra charge will be made for British standard flanges or with flanges of a different diameter or thickness than the regular standard.

MEDIUM AND HEAVY GLOBE AND ANGLE VALVES

Size	inches	1	1¼	1½	2	2½	3
Price	each	2.25	2.75	3.50	5.40	7.35	9.80

MEDIUM AND HEAVY CROSS VALVES

Price	each	2.70	3.30	4.20	6.50	9.00	12.50

FLANGED

GLOBE

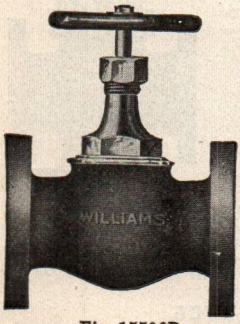


Fig. 15596D

ANGLE

Fig. 15596E

CROSS

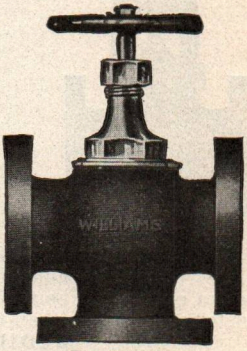


Fig. 15596F

MEDIUM AND HEAVY GLOBE AND ANGLE VALVES

Size	inches	1	1¼	1½	2	2½	3
Price	each	3.25	3.85	4.80	7.00	9.00	12.50

MEDIUM AND HEAVY CROSS VALVES

Price	each	3.90	4.65	5.75	9.00	12.00	16.50

Heavy valves supplied in 2, 2½ and 3½-inch sizes only.

IRON BODY REGRINDING VALVES

WITH FLANGED YOKE, OUTSIDE SCREW STEM BRASS MOUNTED, WITH BRONZE STEMS

Medium Pattern, for Working Pressures up to 125 Pounds
Heavy Pattern, for Working Pressures up to 175 Pounds

SCREWED

GLOBE

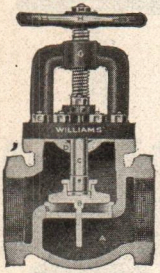


Fig. 14161A

ANGLE

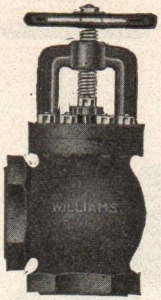


Fig. 14161B

CROSS

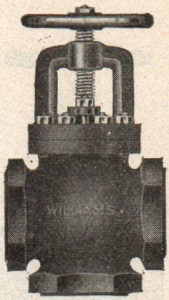


Fig. 14161C

Made of hard, close-grained cast iron; have thick, substantial walls. Screwed valves can be furnished British instead of American standard pipe threads without additional cost.

MEDIUM AND HEAVY GLOBE AND ANGLE VALVES

Size..inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Price..each	7.00	9.00	12.50	15.25	19.00	24.00	27.00	37.50	63.00	72.00	114.00	170.00

MEDIUM AND HEAVY CROSS VALVES

Price..each	8.50	11.75	16.25	20.00	23.50	30.65	35.25	47.25	78.00	92.00	162.00	240.00

FLANGED

GLOBE

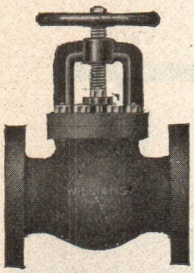


Fig. 14161D

ANGLE

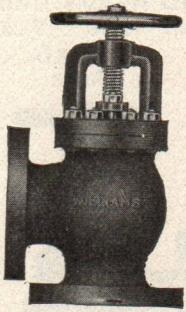


Fig. 14161E

CROSS

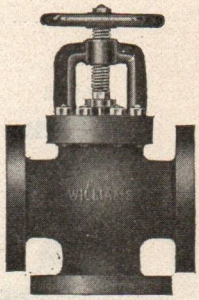


Fig. 14161F

The flanges of these valves are regularly furnished with plain face, but can be tongued and grooved, or companion flanges can be bolted on if desired, at a slight additional cost. An extra charge will be made for British standard flanges or with flanges of a different diameter or thickness than the regular standard.

MEDIUM GLOBE AND ANGLE VALVES

Size..inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Price..each	8.60	10.75	15.00	18.50	22.50	27.50	31.00	42.00	68.00	77.00	123.00	187.00

MEDIUM CROSS VALVES

Price..each	11.00	14.50	20.00	25.00	28.50	36.00	41.00	54.00	85.00	100.00	175.00	265.00

HEAVY GLOBE AND ANGLE VALVES

Price..each	11.00	13.50	18.00	22.00	26.00	32.00	36.00	48.00	75.00	85.00	130.00	200.00

HEAVY CROSS VALVES

Price..each	14.50	18.50	24.50	30.00	34.00	42.00	48.00	63.00	95.00	110.00	190.00	280.00

WILLIAMS IRON BODY CHECK VALVES

BRASS MOUNTED

Medium Pattern for Working Pressure up to 125 Pounds

SCREWED

HORIZONTAL

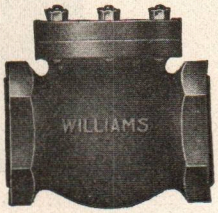


Fig. 12028A

ANGLE

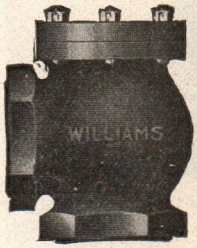


Fig. 12028B

Size ..... inches	2	2½	3	3½	4	4½
Price ..... each	3.60	6.50	8.90	12.25	14.25	19.00
Size ..... inches	5	6	7	8	10	12
Price ..... each	22.00	30.00	45.00	57.00	105.00	155.00

FLANGED

HORIZONTAL

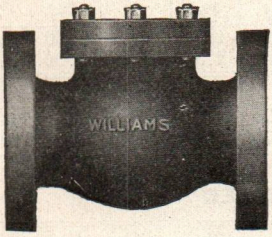


Fig. 12028C

ANGLE

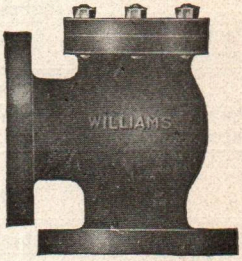


Fig. 12028D

Size ..... inches	2	2½	3	3½	4	4½
Price ..... each	5.25	8.25	11.50	15.50	18.00	22.50
Size ..... inches	5	6	7	8	10	12
Price ..... each	26.00	35.00	50.00	62.00	115.00	175.00

REGRINDING SWING CHECK VALVES

SCREWED

Fig. 12028E

FLANGED

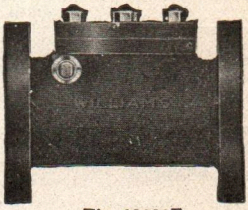


Fig. 12028F

Size ..... inches	2	2½	3	3½	4	4½	5	6	8
Diam. of Flanges "	6	7	7½	8½	9	9¼	10	11	13½
Price, Screwed.... each	6.25	10.00	12.00	16.00	18.00	21.00	25.00	32.00	50.00
" Flanged.... "	8.00	12.00	14.50	19.00	21.00	24.50	29.00	37.00	55.00

FOOT VALVES WITH STRAINERS

BRASS

Fig. 766A

IRON BODY

¾ TO 6-INCH

Fig. 766B

7 TO 16-INCH

Fig. 766C

BRASS

Size ..... inches	½	¾	1	1¼	1½	2	2½	3
Price ..... each	1.50	1.50	2.00	2.75	3.75	5.50	12.00	16.00

IRON BODY—SCREWED

Size ..... inches	¾	1	1¼	1½	2	2½	3	3½
Price, Black..... each	1.15	1.30	1.40	1.90	2.40	3.30	3.90	5.60
" Galvanized..... "	1.75	2.00	2.10	2.85	3.60	5.00	5.75	8.50

Size ..... inches	4	4½	5	6	7	8	10	12
Price, Black..... each	7.30	10.50	11.25	14.75	35.00	41.00	64.00	100.00
" Galvanized ..... "	11.00	15.75	16.75	22.00	53.00	62.00	110.00	155.00

IRON BODY—FLANGED

Size ..... inches	2	2½	3	3½	4	4½	5	6
Diameter of Flanges..... inches	6	7	7½	8½	9	9¼	10	11
Height..... "	5½	6⅜	7	9⅛	9⅛	11⅜	11⅜	12¾
Outside Diameter ..... "	6½	7¼	7½	8⅞	9⅞	10½	10½	11¾
Price..... each	3.50	4.50	5.75	7.50	9.50	13.00	14.00	17.50

Size ..... inches	7	8	10	12	14	15	16	....
Diameter of Flanges..... inches	12½	13½	16	19	21	22¼	23½	....
Height..... "	11⅜	13¼	18½	18	19¾	21¾	24½	....
Outside Diameter ..... "	13⅛	15¼	19⅝	20¼	24⅛	25¼	27	....
Price..... each	38.00	45.00	70.00	112.00	150.00	175.00	200.00	....

IRON BODY WITH NEST OF GATES—FLANGED

RUBBER VALVES

Size..... inches	16	18	20	24	30	36
Diameter of Flanges..... inches	23½	25	27½	32	38¾	45¾
Height..... "	17¾	21⅞	24	29	35	38¾
Outside Diameter..... "	34¾	40¾	46	54½	69½	82
Thickness of Flanges..... "	1 3/16	1¼	1⅜	1 9/16	1¾	1⅞
Price ..... each	190.00	235.00	265.00	400.00	780.00	1200.00

Valves with brass seats will be made to order at special prices.

IRON COCKS

SQUARE HEAD

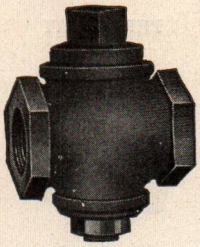


Fig. 14522A

FLAT HEAD

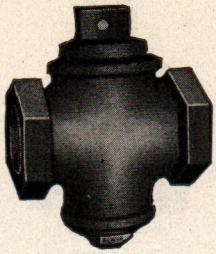


Fig. 14522B

THREE-WAY

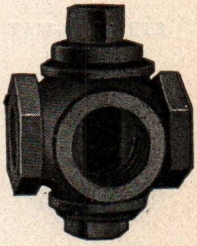


Fig. 14522C

STANDARD, SCREWED—For Working Pressures up to 125 Pounds

Size.....inches	½	¾	1	1¼	1½	2	2½
Price, All Iron.....each	.90	1.05	1.30	1.60	1.95	2.70	4.40
" with Brass Washer "	1.00	1.20	1.55	1.95	2.35	3.20	5.15
" " " Plug... "	1.30	1.60	1.90	2.65	3.75	5.25	8.75
" " Br. Plg. and Wsr. "	1.40	1.75	2.15	3.00	4.15	5.75	9.50

Size.....inches	3	3½	4	5	6	8	....
Price, All Iron.....each	6.75	12.00	15.50	32.00	45.00	100.00	....
" with Brass Washer "	7.75	14.00	19.00	38.00	53.00	110.00	....
" " " Plug... "	13.00	27.50	36.50	67.00	94.00	200.00	....
" " Br. Plg. and Wsr. "	14.00	29.50	40.00	73.00	102.00	210.00	....

STANDARD, FLANGED—For Working Pressures up to 125 Pounds

Size.....inches	2	2½	3	3½
Price, All Iron.....each	4.25	6.25	9.50	15.00
" with Brass Washer ..... "	4.75	7.00	10.50	17.00
" " " Plug ..... "	7.00	10.50	15.75	30.00
" " " " and Washer..... "	7.50	11.25	16.75	32.00

Size.....inches	4	5	6	8
Price, All Iron.....each	19.00	36.00	50.00	110.00
" with Brass Washer..... "	22.50	42.00	58.00	120.00
" " " Plug ..... "	40.00	70.00	100.00	210.00
" " " " and Washer..... "	43.50	76.00	108.00	220.00

½ to 2 inches are furnished flat head. Square head cocks will be furnished unless otherwise ordered.

EXTRA HEAVY—SCREWED—For 200 Pounds Working Pressure

Size .....inches	½	¾	1	1¼	1½	2	2½	3	4
Price, All Iron.....each	1.15	1.25	1.75	2.10	2.80	3.65	6.50	9.00	22.50
" with Brass Washer.. "	1.25	1.40	2.00	2.45	3.20	4.15	7.25	10.00	26.00
" " " Plug.. "	1.70	2.25	2.80	3.85	5.60	7.00	13.25	19.00	56.00
" " Br.Plg.and Wsr. "	1.80	2.40	3.05	4.20	6.00	7.50	14.00	20.00	59.50

THREE-WAY—SCREWED—For Working Pressures up to 125 Pounds

Size.....inches	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Price, All Iron....each	1.65	1.80	2.05	2.65	3.65	5.35	7.50	14.00	19.00	36.50	52.00
" with Brass Washer "	1.80	2.05	2.40	3.05	4.15	6.10	8.50	16.00	22.50	42.50	60.00
" " " Plug.. "	2.20	2.40	3.10	4.50	6.25	9.75	13.75	30.00	40.00	71.50	100.00
" " Br.Plg.andWsr. "	2.35	2.65	3.45	4.90	6.75	10.50	14.75	32.00	43.50	77.50	108.00

Flanged three-way cocks can also be furnished, prices quoted upon receipt of request. All cocks will be furnished with check when so ordered, at a special price.

ASBESTOS PACKED PLUG COCKS

STRAIGHT-WAY

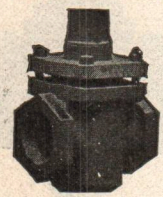


Fig. 6643A

SECTIONAL VIEW

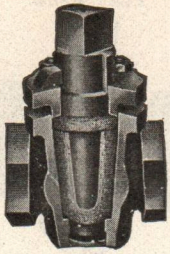


Fig. 6643B

THREE-WAY

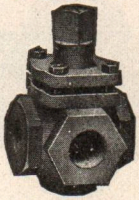


Fig. 6643C

In ordering asbestos packed cocks, specify whether you want a U packed or bushing packed. The U packed is for high pressure and the bushing packed for low pressure. The bushing packed can be repaired without removing cock, while the U packed can only be repaired by sending to the factory.

Size ..... inches	1/8, 1/4	3/8	1/2	3/4	1	1 1/4	1 1/2
Price, Regular, Iron ..... each	1.30	1.45	1.60	2.10	2.50	3.50	4.75
" Bushing Packed ..... "	....	....	1.75	2.30	2.75	3.85	5.25
" Extra Heavy, Iron ..... "	....	....	2.40	3.00	3.50	5.00	6.75
" Angle, Iron ..... "	*1.30	1.45	1.60	2.10	2.50	3.50	4.75
" Three-Way, Iron ..... "	....	....	2.85	3.15	4.40	5.95	8.75
" Recessed, for Ammonia ... "	*1.40	1.50	1.60	2.10	2.50	3.50	4.75
" Gland End, Ammonia .... "	*2.10	2.25	2.45	3.10	3.65	4.75	6.10

Size ..... inches	2	2 1/2	3	3 1/2	4	5	6
Price, Regular, Iron ..... each	7.00	12.00	18.00	27.00	30.00	45.00	60.00
" Bushing Packed ..... "	7.75	13.25	20.00	30.00	35.00	.....	.....
" Extra Heavy, Iron ..... "	10.00	17.00	26.00	38.00	42.00	60.00	80.00
" Angle, Iron ..... "	7.00	12.00	18.00	.....	.....	.....	.....
" Three-Way, Iron ..... "	15.00	22.50	33.75	37.50	56.25	75.00	.....
" Recessed, for Ammonia ... "	7.00	12.00	18.00	.....	.....	.....	.....
" Gland End, Ammonia .... "	8.65	15.50	23.00	.....	.....	.....	.....

*Not made in 1/8 inch size.

Fig. 6643D

REMOVABLE ASBESTOS BUSHINGS AND TOP RINGS

FOR REPACKING BUSHING PACKED COCKS

These bushings are made in one solid piece, vulcanized, and with no seams to pull apart in use by constant turning of the plug, which heretofore has been a great source of annoyance and trouble.

They cannot be used in cell packed cocks.

Size ..... inches	1/2	3/4	1	1 1/4	1 1/2
Price, Bushings ..... each	.75	.75	1.00	1.40	1.90
" Top Rings ..... "	.25	.25	.25	.25	.30

Size ..... inches	2	2 1/2	3	3 1/2	4
Price, Bushings ..... each	2.40	2.90	3.50	4.75	6.00
" Top Rings ..... "	.40	.50	1.00	1.30	1.50

LUNKENHEIMER BLOW-OFF VALVES

"DURO"—IRON BODY BRONZE MOUNTED

WITH SELF-CLEANSING SEAT

For Working Pressures up to 250 Pounds

SCREWED

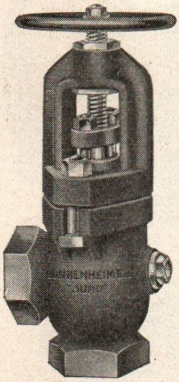
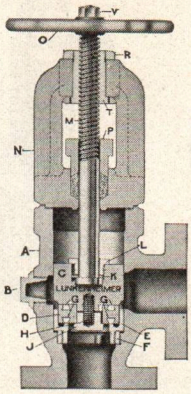


Fig. 5663A

SECTIONAL



FLANGED

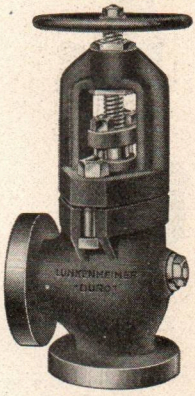


Fig. 5663B

Size ..... inches	1¼	1½	2	2½	3
Price, Screwed ..... each	10.70	12.50	16.00	21.00	27.50
" " and Flanged ..... "	11.30	13.50	17.00	22.00	28.60
" Flanged ..... "	12.00	14.00	18.00	23.00	30.00

REGRINDING STRAIGHTWAY OR "Y" PATTERN

BRONZE

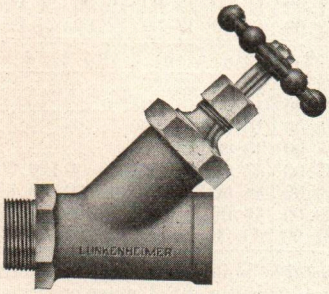


Fig. 5663C

IRON BODY BRONZE MOUNTED

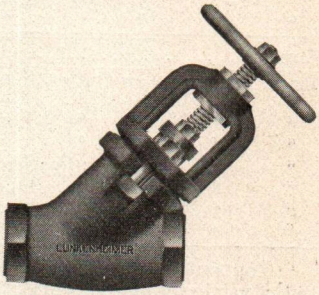


Fig. 5663D

MEDIUM PATTERN

Bronze—For Working Pressures up to 200 Pounds
Iron Body, Bronze Mounted—For Working Pressures up to 125 Pounds

Size ..... inches	¾	1	1¼	1½	2	2½	3
Price, Bronze, Male and Female ... each	2.75	3.25	4.50	5.75	9.00	18.50	....
" " Female Ends ..... "	2.75	3.25	4.50	5.75	9.00	18.50	....
" " Flanged " ..... "	....	7.00	8.70	11.50	19.00	29.00	....
" Iron Body, Female Ends .... "	....	....	....	....	16.50	22.00	31.00
" " " Flanged ..... "	....	....	....	....	18.00	25.00	33.00

POP SAFETY VALVES

BRASS REGULAR TOP OUTLET

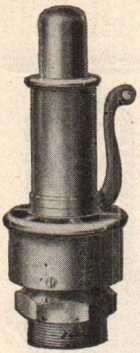


Fig. 9137A

BRASS REGULAR SIDE OUTLET

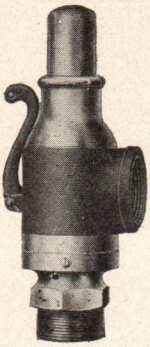


Fig. 9137B

BRASS LOCK-UP TOP OUTLET

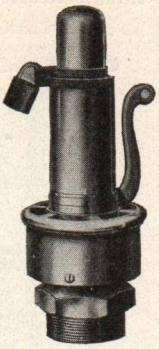


Fig. 9137C

IRON BODY

Fig. 9137D

BRASS

When ordering, state pressure at which valves are to be set to blow off. For working pressures up to 200 pounds.

Size ..... inches	½	¾	1	1¼	1½
Price, Regular, Top Outlet, Semifinished ..... each	8.00	8.00	10.00	12.00	15.00
" " " " Finished ..... "	9.00	9.00	11.00	13.00	16.00
" " " " Lock-up Style, Semifin... "	9.00	9.00	11.00	13.00	17.00
" " " " " " " Fin.... "	10.00	10.00	12.00	14.00	18.00
" " Side Outlet, Semifinished ..... "	10.00	10.00	12.00	15.00	18.00
" " " " Finished ..... "	11.00	11.00	13.00	16.00	19.00
" " " " Lock-up Style, Semifin.. "	11.00	11.00	13.00	16.00	20.00
" " " " " " " Fin... "	12.00	12.00	14.00	17.00	21.00

Size ..... inches	2	2½	3	3½	4
Price. Regular, Top Outlet, Semifinished ..... each	23.00	38.00	65.00	.....	.....
" " " " Finished ..... "	24.00	40.00	68.00	.....	.....
" " " " Lock-up Style, Semifin.. "	25.00	40.00	68.00	.....	.....
" " " " " " " Fin.... "	27.00	43.00	71.00	.....	.....
" " Side Outlet, Semifinished ..... "	27.00	43.00	72.00	95.00	120.00
" " " " Finished ..... "	29.00	46.00	77.00	105.00	135.00
" " " " Lock-up Style, Semifin.... "	29.00	46.00	75.00	98.00	123.00
" " " " " " " Fin..... "	31.00	49.00	80.00	108.00	138.00

Top outlet valves are used on stationary and portable boilers and engines. Side outlet valves for marine and stationary boilers. State which style is wanted, when ordering.

IRON BODY, FOR STATIONARY OR MARINE BOILERS—Screwed or Flanged

Size ..... inches	2	2½	3	3½	4	4½	5	6
For Boilers ..... horse power	30 to 40	40 to 75	75 to 100	100 to 125	125 to 150	150 to 175	175 to 200	225 & up
Diameter of Inlet Flange.. inches	6½	7½	8¼	9	10	10½	11	12½
Price, Bronze Seat ..... each	35.00	42.00	50.00	68.00	75.00	100.00	120.00	170.00
" Nickel " ..... "	40.00	48.00	57.00	75.00	87.00	115.00	135.00	190.00

These valves are furnished for marine or stationary service, which should be specified on order.

WATER RELIEF VALVES

BRASS AND IRON BODY

BRASS

MALE BASE
No. 1126

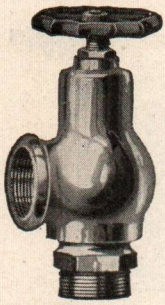


Fig. 784A

FEMALE BASE
No. 1128

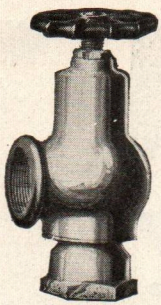


Fig. 784B

HYDRAULIC
No. 1130

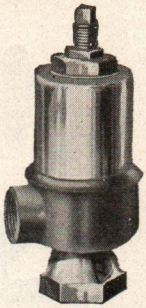


Fig. 784C

IRON BODY
No. 1123

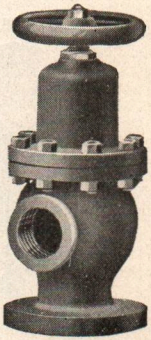


Fig. 784D

No. 1126 Water Relief Valves, sizes 2½-inch and smaller, will be set at any pressure from 10 up to 250 pounds, and sizes 3, 3½ and 4-inch will be set at any pressure from 10 up to 200 pounds. No. 1128 valves will be set at any pressure specified from 5 up to 500 pounds.

No. 1126 Brass Relief Valves will be furnished with male base up to and including 2½-inch; and with female base sizes 3 to 4-inch, inclusive. When required otherwise or flanged, they will be furnished at a special price. Especially adapted for pumps, standpipes, pipe lines, cylinders, etc.

Size .....inches	½	¾	1	1¼	1½	2	2½	3	3½	4
Price, No. 1126, Fin .....each	11.00	11.00	13.00	16.00	19.00	29.00	46.00	77.00	105.00	135.00
" " 1126, N. P..... "	12.00	12.00	14.00	18.00	22.00	32.00	50.00	85.00	115.00	150.00
" " 1128, Fin..... "	25.00	25.00	30.00	35.00	40.00	55.00	100.00	.....	.....	.....
" " 1128, N. P..... "	26.50	26.50	32.00	37.50	43.00	59.00	106.00	.....	.....	.....

BRASS HYDRAULIC, No. 1130

These valves will be set at any pressure specified up to 5000 pounds, according to size. Prices upon application.

IRON BODY, BRASS SEAT, No. 1123

These valves are made with combination flanged and screwed base. Hexagon screwed base furnished, when so ordered, at same price.

Size Inches	Diameter of Base Flange Inches	Center of Outlet to Bottom of Base Flange Inches	Diameter of Outlet Flange Inches	Center of Valve to End of Outlet Inches		Total Height Inches	Price, with Brass Seat Each
*2½	7½	5¼	..	3⅞	Scrd. Outlet	17⅞	42.00
*3	8¼	5¾	..	4¼		18⅞	50.00
*3½	9	6 3/16	..	4⅝		20⅜	68.00
*4	10	6 11/16	..	5		21	75.00
*4½	10½	7⅛	..	6		22½	100.00
5	11	7⅜	10	7 5/16	Flgd.	23⅛	120.00
6	12½	8½	11	8⅛		25⅞	170.00

*These sizes made with screwed outlet, unless otherwise specified.

To adjust for different pressures, loosen locknut, turn handwheel or pressure screw to right to increase pressure, to left to decrease pressure, then tighten locknut.

When valves are wanted for higher pressures than 250 pounds, price will be quoted upon application.

Will be set any pressure from 10 up to 250 pounds. Made with wheel regularly, which will always be furnished, unless otherwise ordered. Made also with square stem nut for wrench adjustment.

FOSTER PRESSURE REGULATING VALVES

PRESSURE REGULATORS

CLASS "Q"

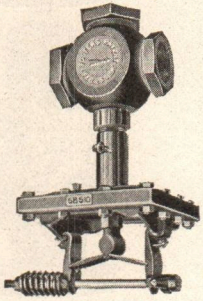


Fig. 6654A

CLASS "Q H"

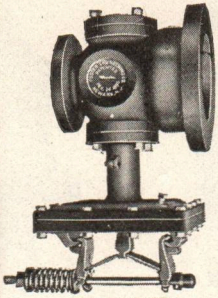


Fig. 6654B

CLASS "W"

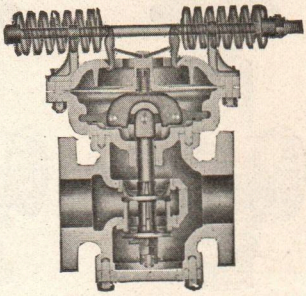


Fig. 6654C

CLASS "Q"—Low Pressure

Size ..... inches	¾	1	1¼	1½	2	2½
Price, Screwed ..... each	18.50	20.00	24.00	28.00	35.00	40.00
" Flanged ..... "	....	....	30.00	33.00	38.00	43.00

Size ..... inches	3	3½	4	5	6	8
Price, Screwed ..... each	48.00	55.00	70.00	85.00	120.00	....
" Flanged ..... "	52.00	60.00	75.00	90.00	125.00	200.00

CLASS "Q H"—Low Pressure

Size ..... inches	¾x1½	1x2	1¼x2½	1½x3	2x4	2½x5	3x6	4x8	5x10	6x12
Price, Screwed... each	24.00	28.00	32.00	38.00	52.00	64.00	84.00	....	....	....
" Flanged... "	27.00	31.00	36.00	42.00	58.00	70.00	90.00	138.00	195.00	260.00

Class "Q" for delivery pressure 1 to 15 pounds for general service. Class "Q H" same as Class "Q" but with enlarged outlet connection.

CLASS "W"

STANDARD—For Initial Working Pressures of 125 Pounds and Under

Size ..... inches	½	¾	1	1¼	1½	2	2½	3	3½	4	4½
Price, Screwed. . each	18.00	20.00	22.00	28.00	35.00	44.00	57.00	72.00	90.00	100.00	120.00
" Flanged. . "	20.00	22.00	24.00	30.00	37.00	46.00	60.00	75.00	95.00	105.00	125.00

Size ..... inches	5	6	7	8	9	10	12	14	16	18	20
Price, Screwed. . each	135.00	180.00	....	....	....	....	....	....	....	....	....
" Flanged. . "	140.00	185.00	220.00	260.00	325.00	350.00	450.00	575.00	700.00	875.00	1150.00

EXTRA HEAVY—For Initial Working Pressure of 125 to 250 Pounds

Size ..... inches	½	¾	1	1¼	1½	2	2½	3	3½	4	4½
Price, Screwed. . each	18.00	20.00	22.00	....	....	....	....	....	....	....	....
" Flanged. . "	20.00	22.00	24.00	30.00	37.00	46.00	60.00	75.00	95.00	105.00	125.00

Size ..... inches	5	6	7	8	9	10	12	14	16	18	20
Price, Flanged. . each	140.00	185.00	220.00	260.00	325.00	350.00	450.00	575.00	700.00	875.00	1150.00

When no pressures are stated, valves will be fitted with springs and diaphragms for delivering between 10 and 60 pounds pressure.

DAVIS PRESSURE REGULATING VALVES

For Any Initial Pressure up to 200 Pounds

No. 1
SCREWED

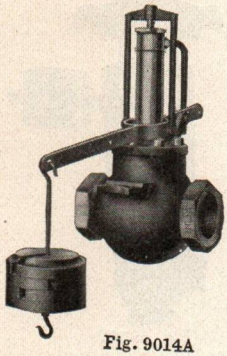


Fig. 9014A

No. 2
FLANGED

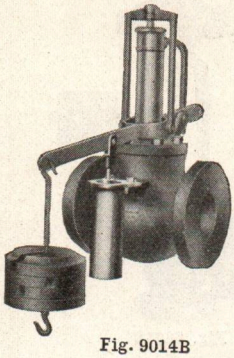


Fig. 9014B

No. 3
SCREWED

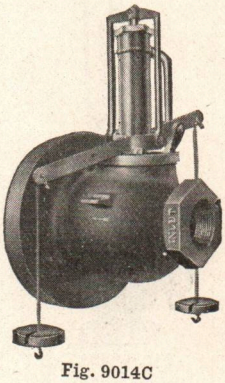


Fig. 9014C

Nos. 1 AND 2

The No. 1 pressure regulator or reducing valve will reduce any initial pressure of 200 pounds or less to any lower delivery pressure and automatically maintain it constant, regardless of the demand or fluctuations in the high pressure. The delivery pressure may be as *low as 1 pound* if the regulator is counterweighted by suspending weights from the opposite end of the lever to overcome the actual weight of the internal parts. Always specify the delivery pressure so a valve of proper construction may be furnished.

No. 2 is practically the same in construction as No. 1; the only difference in construction is the addition of an oil dashpot, which will prevent the lever from jumping when the delivery pressure is subject to pulsation.

Size.....inches	½	¾	1	1¼	1½	2
Price, No. 1.....each	**20.00**	**20.00**	**22.00**	**24.00**	**25.00**	**30.00**
" " 2..... "	**24.00**	**24.00**	**26.00**	**28.00**	**30.00**	**35.00**
Size.....inches	2½	3	3½	4	4½	5
Price, No. 1.....each	**35.00**	**40.00**	**50.00**	**60.00**	**70.00**	**75.00**
" " 2..... "	**40.00**	**46.00**	**56.00**	**68.00**	**80.00**	**85.00**
Size.....inches	6	7	8	10	12	14
Price, No. 1.....each	**100.00**	**135.00**	**175.00**	**275.00**	**400.00**	**500.00**
" " 2..... "	**111.00**	**146.00**	**187.00**	**288.00**	**414.00**	**516.00**

Sizes 1¼-inch and under have bronze bodies; 1½-inch and over are made of iron; 1-inch and under have screwed ends only; 2 to 6-inch, inclusive, have either screwed or flanged ends; 7-inch and over have flanged ends only. Unless otherwise ordered, screwed end valves are sent on orders for sizes less than 6-inch.

No. 3

No. 3 is constructed the same as Nos. 1 and 2, the only difference being that it has an expanded outlet. It is equally well adapted to either high or low pressure service.

Size.....inches	1½x3	2x3	2x4	2½x5	3x5	3x6	3½x7
Price.....each	**40.00**	**45.00**	**50.00**	**65.00**	**75.00**	**85.00**	**100.00**
Size.....inches	4x6	4x7	4x8	5x8	5x9	5x10	6x8
Price.....each	**110.00**	**125.00**	**135.00**	**155.00**	**175.00**	**195.00**	**220.00**
Size.....inches	6x10	6x12	8x10	8x14	8x16	10x16	10x20
Price.....each	**250.00**	**280.00**	**325.00**	**360.00**	**400.00**	**450.00**	**500.00**

Sizes 1½x3 to 2x4-inch have screwed ends only; 2½x5 to 3x6-inch have inlet screwed and outlet flanged; 3½x7-inch and larger have inlet and outlet flanged only.

FISHER PUMP GOVERNORS

REGULAR PATTERN

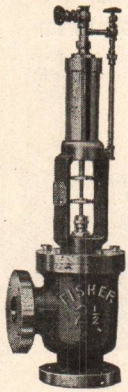


Fig. 6656A

EXCESS PRESSURE

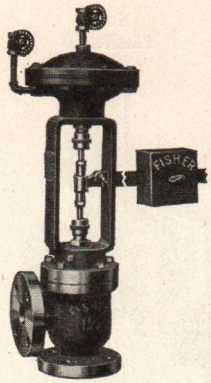


Fig. 6656B

VACUUM PUMP

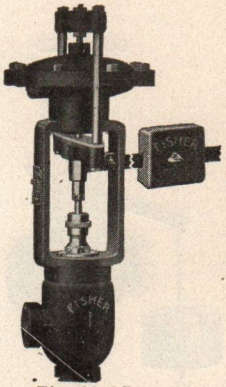


Fig. 6656C

Regular Pattern Governor.—For pressures from 5 to 500 pounds. Can also be furnished to carry a hydraulic pressure of 10000 pounds.

Excess Pressure Governor.—Designed as a thoroughly reliable excess pressure pump governor.

Vacuum Pump Governor.—This type is to be used in connection with all vacuum systems of heating or where a certain number of inches of vacuum are to be maintained. Specify number of inches of vacuum required, when ordering.

Size Inches	Price, Each											
	Regular Pattern				Excess Pressure				Vacuum Pump			
	Angle		Globe		Angle		Globe		Angle		Globe	
	Screwed	Flanged	Screwed	Flanged	Screwed	Flanged	Screwed	Flanged	Screwed	Flanged	Screwed	Flanged
*¼, ⅜	25.00	.....	25.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
½	25.00	.....	25.00	.....	25.00	.....	25.00	.....	30.00	.....	30.50	.....
¾	27.50	.....	27.50	.....	27.50	.....	27.50	.....	30.00	.....	30.50	.....
1	30.00	35.00	30.00	37.50	30.00	35.00	30.00	37.50	35.00	40.00	36.00	42.50
1¼	35.00	40.00	35.00	42.50	35.00	40.00	35.00	42.50	40.00	45.00	41.00	48.50
1½	42.50	45.00	42.50	47.50	42.50	45.00	42.50	47.50	47.50	50.00	48.50	53.00
2	50.00	50.00	50.00	52.50	50.00	50.00	50.00	52.50	55.00	55.00	56.00	58.50
2½	58.00	60.00	58.00	63.00	58.00	60.00	58.00	63.00	63.00	65.00	64.00	70.00
3	70.00	75.00	70.00	78.50	70.00	75.00	70.00	78.50	75.00	80.00	78.50	88.00
3½	82.50	87.50	82.50	90.00	82.50	87.50	82.50	90.00	.....	92.50	.....	100.00
4	.....	100.00	.....	105.00	.....	100.00	.....	105.00	.....	105.00	.....	115.00
4½	.....	112.50	.....	117.50	.....	112.50	.....	117.50	.....	.....	.....	.....
5	.....	125.00	.....	130.00	.....	125.00	.....	130.00	.....	.....	.....	.....
6	.....	150.00	.....	160.00	.....	150.00	.....	160.00	.....	.....	.....	.....
7	.....	187.50	.....	197.50	.....	.....	.....	.....	.....	.....	.....	.....
8	.....	225.00	.....	235.00	.....	.....	.....	.....	.....	.....	.....	.....
10	.....	275.00	.....	275.00	.....	.....	.....	.....	.....	.....	.....	.....
12	.....	450.00	.....	450.00	.....	.....	.....	.....	.....	.....	.....	.....

Give maximum and minimum boiler pressure, also maximum and minimum pump discharge pressure. If used on anything besides cold water, give kind of liquid.

Furnished also in extra heavy flanged.

*Angle not made in ¼-inch size.

GARDNER GOVERNORS

CLASS A

STANDARD GOVERNOR

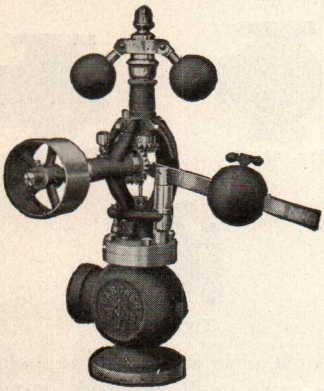


Fig. 9027A

SPRING GOVERNOR

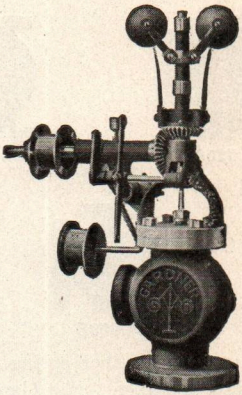


Fig. 9027B

SPRING GOVERNOR
HORIZONTAL TYPE

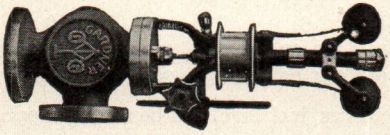


Fig. 9027C

The Standard Class A Governor is of the gravity action and is especially adapted for the larger types of stationary engines. In this governor the centrifugal force of the balls is opposed by the resistance of a weighted lever and the speed is varied by the position of the weight on the lever. The automatic safety stop is simple and absolutely reliable. The action is accomplished by permitting a slight oscillation of the shaft bearing which is supported between centers and held in position by the pull of the belt; a projection at the lower part of the shaft bearing supports the fulcrum of the speed lever. If the belt breaks or slips off the pulley, the support of the fulcrum is forced back, allowing the fulcrum to drop, instantly closing the valve.

Spring governors are recommended for traction and high speed stationary engines. They are quick and sensitive in action and are therefore capable of responding promptly to the various changes in load.

As the name implies, the governors are of spring action entirely and work well in any position. Class A Spring Governor is fitted with speeder, sawyer's lever and automatic stop.

GARDNER GOVERNORS

CLASS A

DIRECTIONS FOR ORDERING AND PRICE LISTS

STYLES OF VALVE CHAMBERS

E

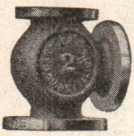


Fig. 7253A

F

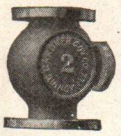


Fig. 7253B

G

Fig. 7253C

H

Fig. 7253D

I

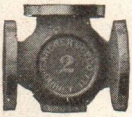


Fig. 7253E

J

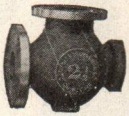


Fig. 7253F

Always state whether spring or standard is desired, plain or finished; also select the style of valve chamber. The Gardner Governor is made to fit any style or make of engine.

STANDARD GOVERNORS

Size.....inches	1¼	1½	2	2½	3	3½	4	4½
Price, Plain ....each	24.50	29.50	36.00	48.00	59.00	71.00	83.00	96.00
" Finished "	27.50	33.50	40.00	53.00	67.00	80.00	93.00	107.00
Size.....inches	5	6	7	8	9	10	12	.....
Price, Plain.....each	109.00	140.00	170.00	210.00	241.00	270.00	335.00	.....
" Finished "	121.00	154.00	186.00	227.00	261.00	290.00	355.00	.....

Prices on sizes 13 to 16 inches, inclusive, will be sent on application.

SPRING GOVERNORS

Size.....inches	½	¾	1	1¼	1½	2	2½
Price, Plain.....each	16.50	18.50	21.00	24.50	29.50	36.00	48.00
" Finished..... "	18.50	20.50	23.00	27.50	33.50	40.00	53.00
Size.....inches	3	3½	4	4½	5	6	7
Price, Plain .....each	59.00	71.00	83.00	96.00	109.00	140.00	170.00
" Finished..... "	67.00	80.00	93.00	107.00	121.00	154.00	186.00

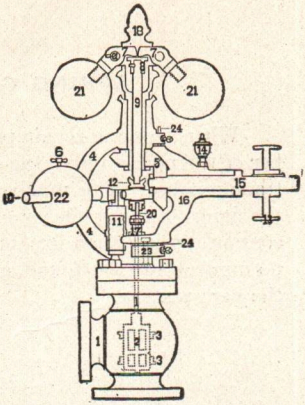
Horizontal type spring governors take the same list.

When any doubt exists in your mind as to the size and style of governor most suitable for your engine, give the following information:

Is engine vertical or horizontal? Diameter of cylinder. Length of stroke. Number of revolutions per minute. Diameter of driving pulley on engine. Length of governor shaft. Diameter and length of steam pipe. Diameter and estimated weight of pulley. Dimensions of rim. State purpose for which engine is used.

REPAIRS FOR GARDNER GOVERNORS

CLASS A—STANDARD

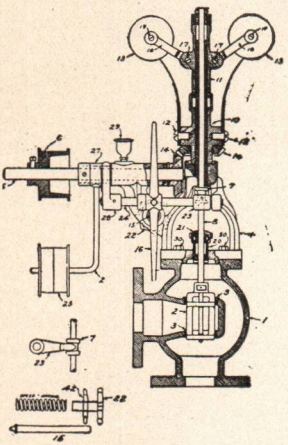


When ordering repair parts state the name or number of the part wanted, the size of the governor and its trade number. This number will be found stamped on the side of the head, part 18, or shaft bearing, part 16, and will contain not less than five, nor more than six figures, unless the governor was made prior to January 1, 1884, in which event the number of the month and the last two figures of the year will be found stamped thereon e. g. if made in January 1880, it will be stamped thus: 1-80.

Prices Effective June 15, 1917

No.	Size ..... inches	1¼	1½	2	2½	3	3½	4	4½	5	6
1	Valve Chamber..... each	5.00	6.00	8.00	12.00	15.00	20.00	25.00	30.00	35.00	50.00
2	" ..... "	1.20	1.35	1.45	1.65	1.95	2.45	2.75	3.30	4.40	5.50
3	" Seats (2)..... per set	1.20	1.35	1.45	1.65	1.95	2.45	2.75	3.30	4.40	5.50
4	Frame..... each	4.00	4.00	5.00	7.50	10.00	12.00	14.50	17.00	19.50	19.50
5	Gears Mitre (2)..... per set	1.65	1.65	1.95	1.95	2.20	2.20	3.10	3.10	4.40	4.40
6	Lever Ball Screw..... each	.40	.40	.55	.55	.65	.65	.95	.95	1.10	1.10
7	Arms (2)..... per set	2.20	2.20	2.75	2.75	3.60	3.60	4.70	4.70	6.60	6.60
8	Toe Plate..... each	.35	.35	.45	.45	.65	.65	.90	.90	1.10	1.10
9	Spindle..... "	.95	.95	1.10	1.10	1.65	1.65	2.20	2.20	3.30	3.30
10	Lever..... "	2.20	2.20	2.75	2.75	3.30	3.30	4.40	4.40	6.60	6.60
11	Fulcrum and Stud..... "	2.75	2.75	3.30	3.30	4.40	4.40	5.50	5.50	7.70	7.70
12	Step Bearing..... "	1.40	1.40	1.65	1.65	2.20	2.20	2.75	2.75	3.30	3.30
13	Pulley..... "	1.10	1.10	1.95	1.95	2.20	2.20	2.50	2.50	2.75	2.75
14	Oil Cup..... "	.30	.30	.45	.45	.45	.45	.55	.55	.55	.55
15	Pulley Shaft..... "	1.65	1.65	2.20	2.20	2.75	2.75	3.85	3.85	5.50	5.50
16	Shaft Bearing..... "	1.95	1.95	2.50	2.50	3.60	3.60	4.40	4.40	6.60	6.60
17	Stuffing Box..... "	1.65	1.65	1.65	1.65	1.65	2.20	2.20	2.20	3.30	3.30
18	Head..... "	5.00	5.00	7.50	7.50	9.50	9.50	12.00	12.00	14.50	14.50
19	Arm Pin (2)..... per set	.35	.35	.40	.40	.55	.55	.65	.65	.95	.95
20	Valve Stem..... each	.35	.35	.40	.50	.55	.65	.80	.85	.95	1.10
21	Arm Balls (2)..... per set	1.65	1.65	2.75	2.75	3.85	3.85	5.50	5.50	7.70	7.70
22	Lever Ball..... each	1.40	1.40	1.65	1.65	2.20	2.20	3.30	3.30	5.50	5.50
23	Check Stud..... "	1.10	1.10	1.40	1.40	1.65	1.65	1.95	1.95	2.20	2.20
24	Sleeve Connections (2)..... per set	.45	.45	.55	.55	.65	.65	.95	.95	1.00	1.00

REPAIRS FOR GARDNER GOVERNORS



SPRING GOVERNORS

When ordering repair parts state the name or number of the part wanted, the size of the governor and its trade number. This number will be found stamped upon the flange of the frame or shaft bearing, part 4, and will contain not less than five, nor more than six figures. If no number can be found, give the exact dimensions of the part wanted.

Prices Effective June 15, 1917

No.	Size.....inches	1¼	1½	2	2½	3	3½	4	4½	5	6
1	Chamber.....each	5.00	6.00	8.00	12.00	15.00	20.00	25.00	30.00	35.00	50.00
2	Valve..... "	1.20	1.30	1.45	1.65	1.95	2.40	2.75	3.30	4.40	5.50
3	" Seats (2).....per set	1.20	1.30	1.45	1.65	1.95	2.40	2.75	3.30	4.40	5.50
4	Frame and Standard. "	3.75	4.50	5.50	7.25	9.50	11.00	13.50	15.75	18.50	20.00
5	Pulley Shaft.....each	1.95	1.95	2.20	2.20	3.30	3.30	3.85	3.85	4.40	4.40
6	" ..... "	1.35	1.65	1.65	2.20	2.20	2.20	3.30	3.30	3.30	4.40
7	Spool..... "	.35	.40	.40	.55	.55	.55	.85	.85	.85	1.40
8	Valve Stem..... "	.50	.55	.70	.90	1.00	1.10	1.20	1.40	1.65	1.95
9	Collar..... "	.45	.55	.55	.65	.65	.65	.85	.85	.85	1.40
10	Revolving Head..... "	1.75	2.00	2.00	2.75	2.75	2.75	4.15	4.15	4.95	4.95
11	Sliding Sleeve..... "	1.75	2.00	2.00	2.75	2.75	2.75	4.15	4.15	4.95	4.95
12	Spring Cap Screw..... "	.15	.25	.25	.25	.25	.25	.30	.30	.30	.30
13	Balls and Springs...per pair	2.20	2.75	2.75	3.85	3.85	3.85	5.50	5.50	7.70	7.70
14	Gears.....per set	1.75	1.75	1.75	2.20	2.20	2.20	3.85	3.85	4.95	4.95
15	Speeder Spring and Guide... "	.40	.45	.45	.55	.55	.55	.95	.95	1.40	1.40
16	Hand Lever.....each	.80	.95	.95	1.40	1.40	1.40	1.65	1.65	1.95	1.95
17	Yoke Pins (2) Short, per set	.35	.45	.45	.55	.55	.55	.65	.65	.85	.85
18	" (2)..... "	1.35	1.50	1.50	1.75	1.75	1.75	2.20	2.20	3.30	3.30
19	" Pins (2) Long.. "	.45	.55	.55	.65	.65	.65	.80	.80	.95	.95
20	Stuffing Box (Bottom)..each	.85	.85	.85	1.10	1.10	1.10	1.65	1.65	2.20	2.20
21	" " (Cap)..... "	.65	.65	.65	.85	.85	.85	1.10	1.10	1.65	1.65
22	Speed Screw..... "	.40	.45	.45	.55	.55	.55	.85	.85	1.10	1.10
23	Short Lever..... "	.45	.55	.55	.65	.65	.65	.95	.95	1.10	1.10
24	Lever Shaft..... "	.40	.55	.55	.65	.65	.65	.95	.95	1.10	1.10
25	Stop Motion Idle Pulley "	1.40	1.95	1.95	2.20	2.20	2.20	3.30	3.30	3.85	3.85
26	" " Drop Arm "	.95	1.10	1.10	1.65	1.65	1.65	2.20	2.20	2.75	2.75
27	" " Sleeve.... "	1.65	2.20	2.20	2.75	2.75	2.75	3.85	3.85	4.40	4.40
28	" " Lever..... "	1.00	1.20	1.20	1.65	1.65	1.65	2.20	2.20	2.75	2.75
29	Oil Cup..... "	.30	.30	.30	.45	.45	.45	.55	.55	.65	.65
30	Cap Screws (4).....per set	.35	.45	.45	.55	.55	.55	.80	.80	.90	.90

STRONG PUMP GOVERNORS AND PRESSURE REGULATORS

TYPE S

EXTERIOR

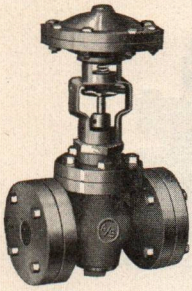


Fig. 8949A

OPERATION

The Strong Type S Valve is operated by an auxiliary or pilot valve controlled by the reduced or discharge pressure. The function of the pilot is to admit the initial pressure to the upper surface of main valve piston.

USED AS A REDUCING VALVE

As a pressure of 25 pounds is required to operate the main valve, it is necessary that there be at least a difference of 25 pounds between the initial and regulated pressure to insure perfect operation. In other words, if a reduced pressure is wanted of 75 pounds, the initial pressure at the valve should not be less than 100 pounds. If 25 pounds is wanted—then 50 pounds initial pressure at the valve, etc.

SECTIONAL

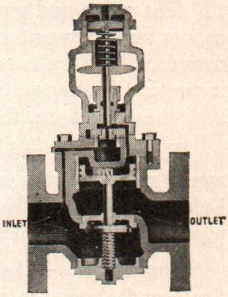


Fig. 8949B

As the high pressure is used to operate the main valve, it is positive in operation, and being controlled by an independent pilot valve, the regulator will hold an accurate regulated pressure, regardless of fluctuations in the initial pressure.

Steam coming to the valve through the inlet, passes to the piston chamber through the port leading from the inlet side of the valve to the pilot. The pressure builds up in the piston chamber, forcing the piston downward and opening the main valve. The initial pressure now passes through the valve into the low pressure side and builds up the low pressure until it reaches the point for which pilot is set. The low pressure is transmitted to the pilot through the line connecting the pilot with the low pressure line, and acting upon the pilot diaphragm forces it against the spring and closes the passage to the piston chamber. The low pressure acting upon the lower surface of the piston, the high pressure on the main valve disc and the disc spring force the main valve closed. As soon as the low pressure drops, the pilot spring lifts the pilot valve from its seat and the high pressure again forces main valve open.

USED AS A PUMP GOVERNOR

The principle of operation is the same as described under "used as a reducing valve."

The pilot is operated by the water pressure on the discharge line from the pump, and as the water pressure is independent of the steam pressure, the governor will operate under any steam pressure above 25 pounds, whatever the discharge pressure may be.

Size.....inches	½	¾	1	1¼	1½	2	2½
Price.....each	**25.00**	**27.00**	**30.00**	**35.00**	**37.00**	**45.00**	**60.00**
Size.....inches	3	4	5	6	7	8	.....
Price.....each	**75.00**	**105.00**	**140.00**	**185.00**	**220.00**	**260.00**	.....

Sizes ½ to 1-inch, inclusive, are screwed; 1¼ and larger, flanged. Companion flanges are furnished for 1¼, 1½, 2 and 2½-inch sizes only. Larger sizes will be furnished without flanges, unless specially ordered. All valves are extra heavy.

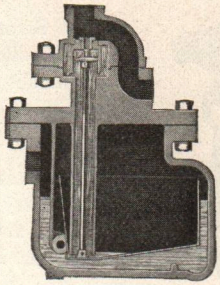
STRONG STEAM TRAPS

BUCKET TYPE

EXTERIOR

Fig. 585A

SECTIONAL



The valve and seat, the only wearing parts, are made from a combination of nickel, copper, and government bronze, of the highest quality as a steam wearing metal, and the design of the trap is such that by removing the cap both the valve and seat are open to inspection. As the actual wearing parts contain but a small amount of metal and require but little machine work, the valve and seat can be renewed at a very small expense.

Valves, seats and all other parts interchangeable. All joints machined. All measurements made from finished surfaces. Valve always water-sealed — steam cannot escape. Valve may be tested for tightness while trap is in service. One trap can be fitted for any pressure, from 0 to 250 pounds.

Operation. — As soon as sufficient water enters the trap, the bucket, being buoyant, floats and closes the valve and the trap is in operation. As the condensation increases the body of the trap fills and the water enters the bucket, causing it to sink. The bucket being attached to the discharge valve, opens it and the trap begins to discharge, continuing to do so until the condensation is blown out of the body to the lowest edge of the bucket, when the water in the bucket is forced out until the bucket again becomes buoyant, rises and closes the valve.

Number	00	0	1	2	3	4	5
Capacity, Lineal feet of 1-inch	9000	13500	18900	32400	4800	108000	156000
" square feet of Radiation	3000	4500	6300	10800	16200	36000	51000
" pounds of Water per	1000	1500	2100	5400	7500	12000	19500
Size of Pipe Connections..inches	⅜	½	¾	1	1¼	1½	2
Price.....each	**21.50**	**27.50**	**30.50**	**40.00**	**55.00**	**75.00**	**105.00**

Unless otherwise specified, standard pressure traps will be shipped.

We furnish at the same prices for different pressures, as follows:

Gravity Trap ..... 10 lbs. or less
Low Pressure Traps ..... 10 lbs. to 30 lbs.
Standard Pressure Traps ..... 30 lbs. to 125 lbs.
High Pressure Traps ..... 125 lbs. and upwards

WRIGHT EMERGENCY STEAM TRAPS

EXTERIOR

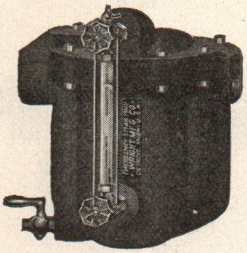


Fig. 5050A

Wright Steam Traps for high pressure service are designed, constructed and guaranteed to drain automatically and continuously all accumulated condensation from steam pipes, regardless of small floods of water, without steam waste in the operation.

Wright Emergency Steam Traps have gained an enviable reputation for efficiency and general excellence, and will be found to-day in a majority of the steam plants in which thoroughly modern equipment is made a feature. No effort has been spared to make them perfect in every detail.

Three steam-tight valves are located at the highest point of the trap, where they are entirely removed from accumulations of grit, scale, sediment, etc., and therefore can hardly become inoperative from the causes named. The condensation enters the trap, filling it to about the center and forming a seal of from 4 to 6 inches of water at both inlet and outlet, which prevents any possible escape and waste of steam. When thus filled, the float rises and opens the center valve (indicated as valve No. 1, as shown in the enlarged view of the valve arrangement slightly, if there is but little water coming in, but widely if a sudden inflow. This one valve is equal to the task of taking care of the flow under ordinary conditions, but if the water comes into the trap faster than one valve can discharge it, the water rises in the trap, carrying the float with it and opening valve No. 2 sufficiently to discharge the surplus water, or wide open if necessary. Valve No. 3 is opened in the same manner, providing for the full capacity of the inlet pipe, but it rarely happens that the volume of condensation coming into the trap is sufficient to tax the combined capacity of all three valves. Ordinarily one valve alone is able to do the work, leaving two valves in reserve for emergencies.

THREE VALVES GREAT CAPACITY

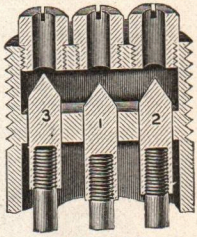


Fig. 5050B

SECTIONAL

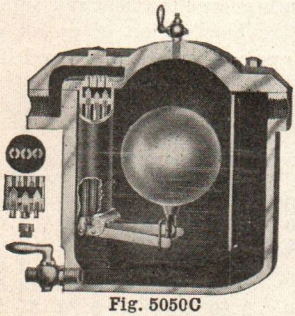


Fig. 5050C

All working parts are attached to the cover and are accessible without disturbing the piping in the least.

The valve and valve seats are clearly shown in the illustration. Both valves and valve seats are made of the best monel metal, and may be renewed or repaired if necessary without removing the cover from the trap by unscrewing the iron plug over the tube, when the valve seats may be easily taken out with a screwdriver.

Number	1	2	3	4	5	6	7	8
Cap., Lineal Ft. of 1-in. Pipe	9,000	11,100	13,800	23,400	37,800	60,300	87,300	126,000
" Radiation . . . square feet	4,000	3,700	4,600	7,800	12,600	20,100	29,000	42,000
Maximum Discharge per Hour . . . pounds	4,400	5,600	7,000	10,400	14,400	19,200	32,000	45,500
Inlet and Outlet . . . . . inches	½	¾	1	1¼	1½	2	2½	3
Distance through Inlet and Outlet . "	11¼	12	12¾	13¾	15½	16½	18	19½
Price . . . . . each	**26.50**	**28.50**	**36.00**	**43.00**	**60.00**	**82.00**	**132.00**	**150.00**

Emergency Steam Traps are guaranteed on all steam pressures up to 200 pounds.

NASON STEAM TRAPS

CLASS B

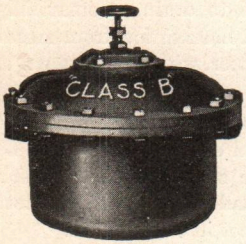


Fig. 9593A

CLASS C

Fig. 9593B

SIDELUG—Patented

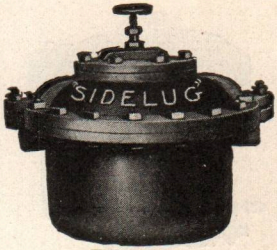


Fig. 9593C

Number	1	2	3	4	5
Size of Pipe Connections.....inches	½	¾	1	1¼	1½
Discharge per Minute.....pounds	4½	6½	10	15½	23
Capacity, Lineal Feet of 1-inch Pipe	1500	3450	5250	7650	12000
" Square Feet of Direct Radiation	500	1150	1750	2550	4000
Diameter of Flange.....inches	10¾	14¼	15¾	19	24¼
Height over Valve..... "	11	14	16¼	18½	23½
" " Cover..... "	8	10	12	14	15½
Weight, Classes B and C.....pounds	40	80	113	176	336
" Sidelug..... "	47	92	125	212	343
Price, Classes B and C.....each	**16.00**	**20.00**	**27.50**	**42.50**	**70.00**
" Sidelug..... "	**16.85**	**21.30**	**29.25**	**45.50**	**74.75**

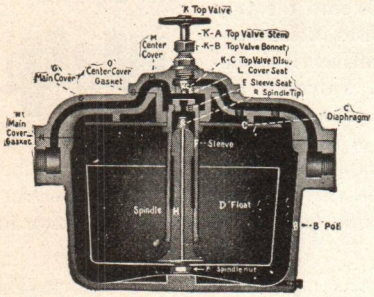


Fig. 9593D

Class B is designed for low pressure service, not exceeding 20 pounds pressure. Class C is designed for medium service for pressures between 20 and 70 pounds.

The Sidelug Trap embodies the Nason principles, is heavier in construction, and in addition has extension lugs over the inlet and outlet ports to obviate the blowing out of gasket at these points. For pressures between 40 and 150 pounds.

REPAIRS

In ordering repairs be particular to note what style of trap they are for.

Number of Trap	1	2	3	4	5
Price, K —Top Valve.....each	**1.00**	**1.40**	**1.60**	**2.00**	**2.10**
" KA— " " Stem only..... "	**.50**	**.60**	**.70**	**.70**	**1.00**
" KB— " " Bonnet only..... "	**.35**	**.40**	**.45**	**.45**	**.65**
" KC— " " Disc " ..... "	....	....	....	....	**1.00**
" M—Center Cover..... "	....	....	....	**3.50**	**4.00**
" G—Main " ..... "	**2.40**	**3.60**	**5.00**	**8.20**	**15.60**
" N— " " Gasket..... "	**.25**	**.40**	**.60**	**1.20**	**1.70**
" L—Cover Seat..... "	**.40**	**.40**	**.60**	**.70**	**.80**
" E—Sleeve " ..... "	**.30**	**.40**	**.50**	**.60**	**.70**
" C—Diaphragm..... "	**.30**	**.50**	**.60**	**1.20**	**1.60**
" F—Sleeve..... "	**1.20**	**1.60**	**2.00**	**2.70**	**4.50**
" H—Spindle..... "	**1.00**	**1.40**	**1.70**	**2.50**	**3.50**
" B—Pot..... "	**3.00**	**4.50**	**7.00**	**10.50**	**18.80**
" D—Float..... "	**.80**	**1.00**	**1.00**	**2.00**	**2.50**
" P—Spindle Nut..... "	**.30**	**.30**	**.30**	**.40**	**.40**
" R— " Tip (No. 5 only Detachable). "	....	....	....	....	**.80**

COCHRANE STEAM AND OIL SEPARATORS

No. 2

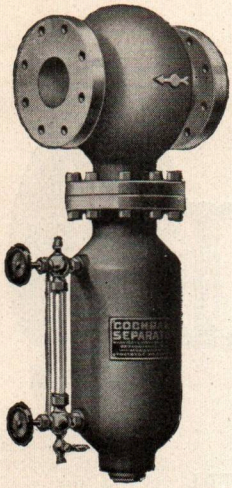


Fig. 24168A

No. 33

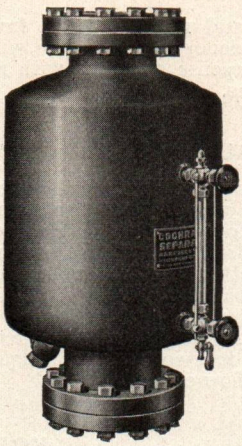


Fig. 24168B

No. 21

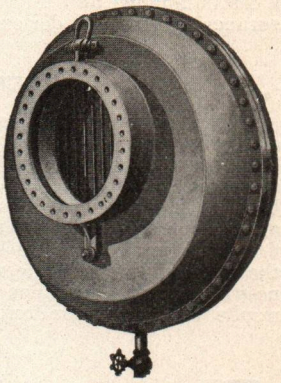


Fig. 24168C

Cochrane Steam Separators are used for protecting engines, pumps, turbines, etc., from water. Are guaranteed to deliver steam containing less than 1½ per cent of moisture. Dry steam insures better lubrication with less oil, and results in less friction and wear.

No. 2 is for live steam or compressed air systems, and pressures 200 pounds per square inch or less. No. 33 is for live steam or compressed air systems; pressures, 175 pounds per square inch or less. Oil separators for purifying exhaust steam are similar in construction but are built for lower pressures.

No. 21 is for vacuum condensing systems.

Size.....inches	2	2½	3	3½	4	4½	5	6
Diameter of Flanges, No. 2 "	6½	7½	8¼	9	10	10½	11	12½
" " " " 33 "	....	....	8¼	9	10	10½	11	12½
Size of Drip, No. 2 ..... "	½	½	½	½	¾	¾	1	1
" " " " 33 ..... "	....	....	½	½	¾	¾	1	1
Face to Face, No. 2 ..... "	9½	10½	11	12	13	13½	14	15½
" " " " 33 ..... "	....	....	24	26	28	29½	31	33
Size.....inches	7	8	9	10	12	14	16	18
Diameter of Flanges, No. 2 "	14	15	16¼	17½	20½	....	....	....
" " " " 33 "	14	15	....	17½	20½	....	....	....
" " " " 21 "	....	....	....	....	....	21	23½	25
Size of Drip, No. 2..... "	1	1¼	1¼	1½	1½	....	....	....
" " " " 33..... "	1	1¼	....	1½	1½	....	....	....
" " " " 21..... "	....	....	....	....	....	1½	1½	2
Face to Face, No. 2..... "	17	19	21	22	25	....	....	....
" " " " 33..... "	35	36	....	40	42	....	....	....
" " " " 21..... "	....	...	....	....	....	25½	27	28½

Size.....inches	20	22	24	26	28
Diameter of Flanges, No. 21..... "	27½	29½	32	34¼	36½
Size of Drip, No. 21..... "	2	2	2	2	2
Face to Face, " 21..... "	30	32	34	36	37

No. 21 can be furnished in larger sizes if required.
Prices upon application.

AUSTIN CAST IRON STEAM SEPARATORS

For Working Pressure 250 Pounds

STANDARD PATTERNS

They separate the moisture and slugs of water from live steam, insuring a higher efficiency in the engine, with a minimum fuel and lubricant expense, together with insurance against cylinder explosions.

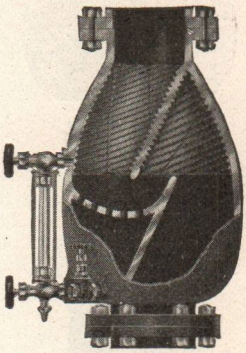


Fig. 839A

VERTICAL

This is, without question, one of the most perfect separators ever devised for taking water out of live steam. When installed above the throttle of an engine, with a good steam trap of ample size to fully drain the receiving chamber, it furnishes steam that is better than 99 per cent dry, and in some tests as high as 99.6 has been attained. Since first introduced, there has been no material modification in the design of this machine, which in itself proves the correctness of the principles upon which it is constructed. Equal results with upward or downward flow of steam.

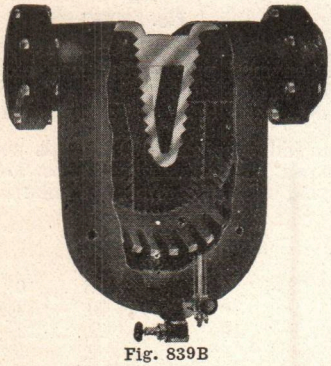


Fig. 839B

HORIZONTAL

The principle upon which the horizontal is designed is known as an undershot construction. By this is meant that the steam, after being impinged against a baffle plate, passes around under the baffle plate to the outlet. The main feature contributing to the successful operation of this form of separator is that the baffle plate is not set at right angles to the entering steam current, but is set at an angle so that when the steam is impinged against it the particles of water rebound at an opposite angle. This sets up a rotating motion in the steam, bringing the latter in contact with the inside walls of the separator. These walls are heavily corrugated, as is also the surface of the baffle plate, and all corrugations are designed so as to carry the drainage out of and away from the course of the steam. Additional baffles in the well or receiver of the separator serve to separate any oil or water not caught by the upper baffles and further to prevent the steam current from picking up the oil and water in the receiver as it passes. Can be connected either right or left-hand.

Size	inches	1½	2	2½	3	3½	4	4½
Diameter of Flanges	"	Screwed	Screwed	7	7½	8½	9	9¼
Face to Face, Vertical	"	11	11	13	15¼	16¾	18	20
" " " Horizontal	"	7	7	8	9	10	11	12
Weights	pounds	50	50	95	125	135	160	215
Drains	inches	½	½	¾	¾	¾	¾	¾
Size	inches	5	6	7	8	10	12	....
Diameter of Flanges	"	10	11	12½	13½	16	19	....
Face to Face, Vertical	"	22¼	25¼	28½	31½	37	40½	....
" " " Horizontal	"	13	15	17	19	23	25½	....
Weights	pounds	245	315	440	575	910	1000	....
Drains	inches	1	1	1¼	1¼	1½	1½	....

*Vertical not made in 14-inch size. Special or drilled flanges, as required.

Prices upon application.

CAPITOL SMOKELESS BOILERS

500 SERIES

STEAM AND WATER

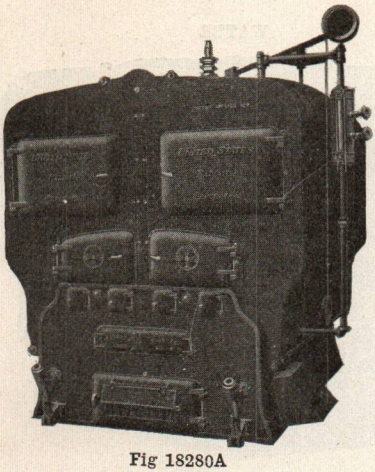


Fig 18280A

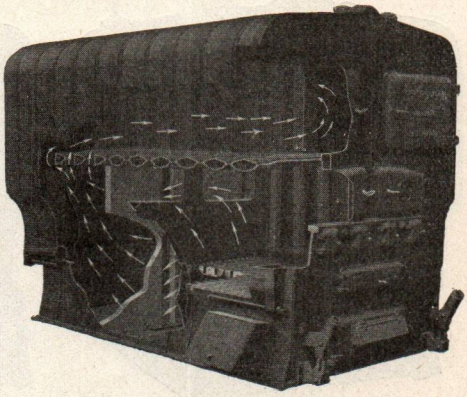


Fig. 18280B

The Capitol Smokeless Boiler has been developed to meet a growing demand on the part of the public for boilers which will burn the bituminous coals of the United States without smoke.

This boiler contains a large fire box where bituminous coal is burned at a rapid rate of combustion. The air is admitted principally through the grates and fuel bed, with an auxiliary supply admitted at the front of the furnace, which mixes with the volatile gases distilled from the fuel bed.

The principle of complete combustion in this boiler before the gases are cooled, as opposed to the downdraft principle in which the cooling of the volatile gases begins at the upper or water grate, results in exceedingly high efficiencies.

The Capitol Smokeless Boiler will do the same amount of work with less fuel than any cast iron downdraft boiler. As the volatile matter of the coal is completely burned in the boiler there is no smoke to escape to the open air except during the time when the fire doors are open and coal is being fed to the boilers.

The operation of the Capitol Smokeless Boiler is exceedingly simple. No skilled operator is necessary to obtain smokeless results.

No. of Boiler	Total Length Inches	Total Height Inches	Total Width Inches	Height Water Line Inches	Coal Capacity Cu. Ft.	Smoke Collar Inches	Outlets and Inlet Inches	Size of Base Inches	Rating Sq. Ft.	Price
STEAM										
508	87	97¾	82	66	18.87	21	3–5	57¾x 67⅞	6275	**1599.00**
509	96	97¾	82	66	23.73	21	4–5	57¾x 77	7150	**1774.00**
510	105	97¾	82	66	28.59	21	4–5	57¾x 86⅛	8025	**1949.00**
511	114	97¾	82	66	28.59	21	4–5	57¾x 95¼	8900	**2124.00**
512	123	97¾	82	66	29.58	21	5–5	57¾x104⅜	9775	**2299.00**
WATER										
508	87	77¾	71¾	..	18.87	21	3–5	57¾x 67⅞	10000	**1579.00**
509	96	77¾	71¾	..	23.73	21	4–5	57¾x 77	11400	**1754.00**
510	105	77¾	71¾	..	28.59	21	4–5	57¾x 86⅛	13000	**1929.00**
511	114	77¾	71¾	..	28.59	21	4–5	57¾x 95¼	14250	**2104.00**
512	123	77¾	71¾	..	29.58	21	5–5	57¾x104⅜	15650	**2279.00**

CAPITOL SECTIONAL BOILERS

WN270 SERIES

STEAM

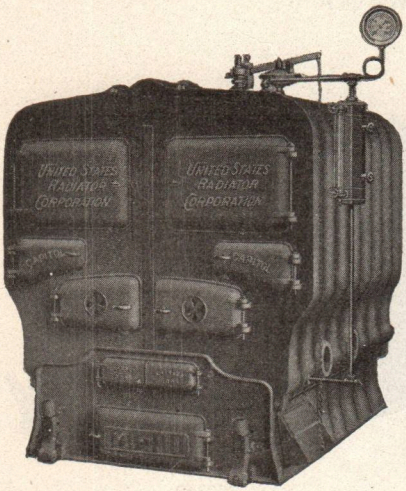


Fig. 5705A

WATER

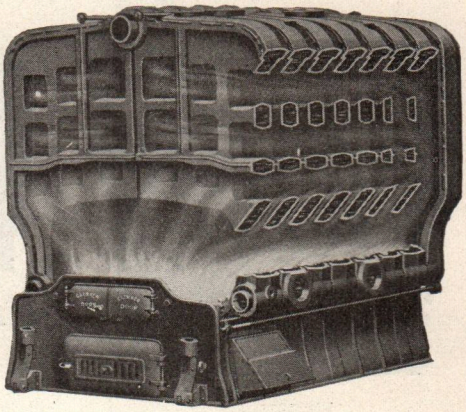


Fig. 5705B

STEAM

No. of Boiler	Total Length Inches	*Height Inches	*Width Inches	Height Water Line Inches	Coal Capacity Cu. Feet	Smoke Collar Inches	Outlets and Inlets Inches	Size of Base Inches	Hourly Rating Sq. Ft.	Price
WN276	69	97¾	82	66	24.66	21	3—5	57¾x 49⅝	4550	**1250.00**
WN277	78	97¾	82	66	29.67	21	3—5	57¾x 58¾	5475	**1435.00**
WN278	87	97¾	82	66	34.68	21	3—5	57¾x 67⅞	6400	**1620.00**
WN279	96	97¾	82	66	39.69	21	4—5	57¾x 77	7325	**1805.00**
WN280	105	97¾	82	66	44.71	21	4—5	57¾x 86⅛	8250	**1990.00**
WN281	114	97¾	82	66	49.72	21	4—5	57¾x 95¼	9175	**2175.00**
WN282	123	97¾	82	66	54.73	21	4—5	57¾x104⅜	10100	**2360.00**

*Measurements include trimmings.

WATER

WN276	69	77¾	71¾	....	24.66	21	3—5	57¾x 49⅝	7475	**1230.00**
WN277	78	77¾	71¾	....	29.67	21	3—5	57¾x 58¾	9000	**1415.00**
WN278	87	77¾	71¾	....	34.68	21	3—5	57¾x 67⅞	10525	**1600.00**
WN279	96	77¾	71¾	....	39.69	21	4—5	57¾x 77	12050	**1785.00**
WN280	105	77¾	71¾	....	44.71	21	4—5	57¾x 86⅛	13575	**1970.00**
WN281	114	77¾	71¾	....	49.72	21	4—5	57¾x 95¼	15100	**2155.00**
WN282	123	77¾	71¾	....	54.73	21	4—5	57¾x104⅜	16625	**2340.00**

When so specified we can furnish bridge wall plates thus reducing depth or fire pot by depth of one or more sections.

Do not bush flow-pipe outlets but connect them full size to the main.

Use a larger boiler for soft coal.

CAPITOL SECTIONAL BOILERS

G270 SERIES

STEAM

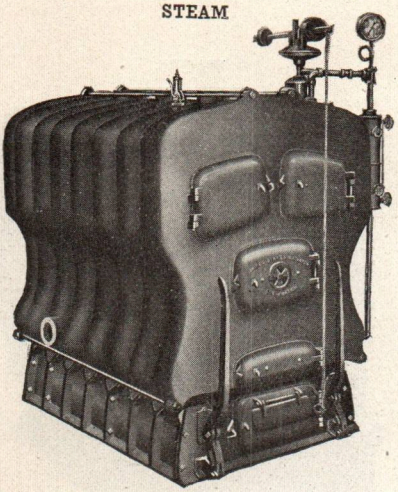


Fig. 9684A

WATER

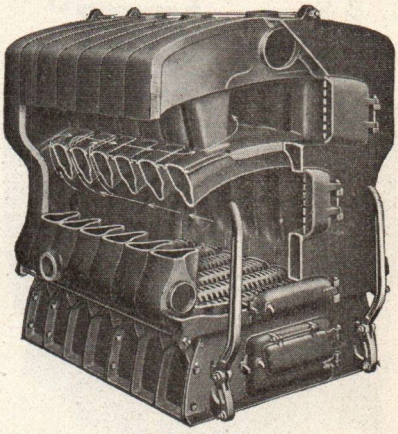


Fig. 9684B

STEAM

No. of Boiler	Total Length Inches	*Height Inches	*Width Inches	Height of Water Line Inches	Coal Capacity Cubic Feet	Size of Smoke Collar Inches	No. and Size of Outlets and Inlets Inches	Size of Base Inches	8 hour Ratings Square Feet	Price
G-276	55	72	50¾	45½	7.93	14	2—4	36x36	1350	**505.00**
G-277	62	72	50¾	45½	9.65	14	2—4	36x42¾	1650	**595.00**
G-278	68	72	50¾	45½	11.37	14	3—4	36x49½	1950	**685.00**
G-279	75	72	50¾	45½	13.09	14	3—4	36x56¼	2250	**775.00**

WATER

G-276	55	55¾	43½	....	7.93	14	2—4	36x36	2230	**495.00**
G-277	62	55¾	43½	....	9.65	14	2—4	36x42¾	2720	**585.00**
G-278	68	55¾	43½	....	11.37	14	3—4	36x49½	3210	**675.00**
G-279	75	55¾	43½	....	13.09	14	3—4	36x56¼	3700	**765.00**

*Measurements include trimmings.

Use a larger boiler for soft coal.

Do not bush flow-pipe outlets but connect them full size to the mains.

CAPITOL SECTIONAL BOILERS

230 SERIES

STEAM

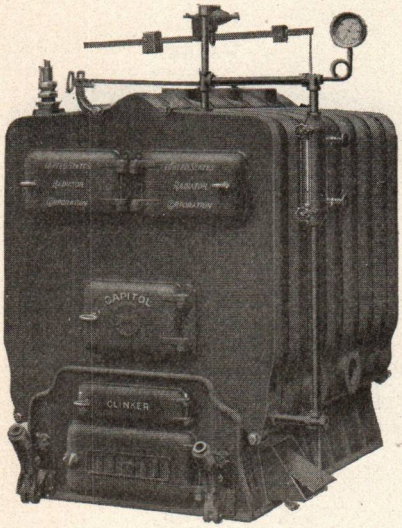


Fig. 2552A

WATER

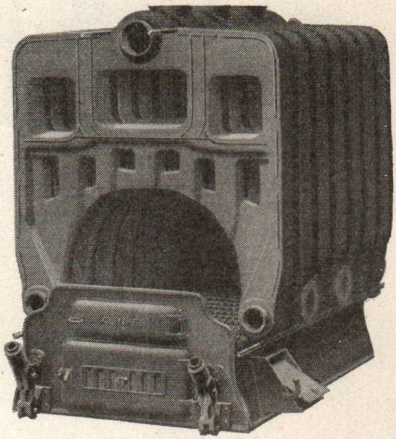


Fig. 2552B

STEAM

No. of Boiler	Total Length Inches	*Height Inches	*Width Inches	Height Water Line Inches	Coal Capacity Cu. Feet	Smoke Collar Inches	Outlets and Inlets Inches	Base Inches	8 Hour Rating Square Feet	Price
235	55	74	60¼	53	11.01	14	2—4	41¼x36½	1900	**670.00**
236	63	74	60¼	53	13.75	14	2—4	41¼x44¾	2350	**797.00**
237	71	74	60¼	53	16.49	14	3—4	41¼x53	2800	**905.00**
238	79	74	60¼	53	19.22	14	3—4	41¼x61¼	3250	**995.00**
239	87	74	60¼	53	21.96	14	4—4	41¼x69½	3700	**1085.00**
240	95	74	60¼	53	24.70	14	4—4	41¼x77¾	4150	**1175.00**

WATER

235	55	65	48½	....	11.01	14	2—4	41¼x36½	3150	**655.00**
236	63	65	48½	....	13.75	14	2—4	41¼x44¾	3900	**782.00**
237	71	65	48½	....	16.49	14	3—4	41¼x53	4650	**890.00**
238	79	65	48½	....	19.22	14	3—4	41¼x61¼	5450	**980.00**
239	87	65	48½	....	21.96	14	4—4	41¼x69½	6150	**1070.00**
240	95	65	48½	....	24.70	14	4—4	41¼x77¾	6900	**1160.00**

*Measurements include trimmings.

Use a larger boiler for soft coal.

Do not bush flow pipe outlets but connect them full size to the main.

When thought necessary on account of draft conditions, the length of grate can be reduced by taking out one or more grate bars and filling in with fire brick.

CAPITOL SECTIONAL BOILERS

250 SERIES

STEAM

Fig. 10703A

WATER

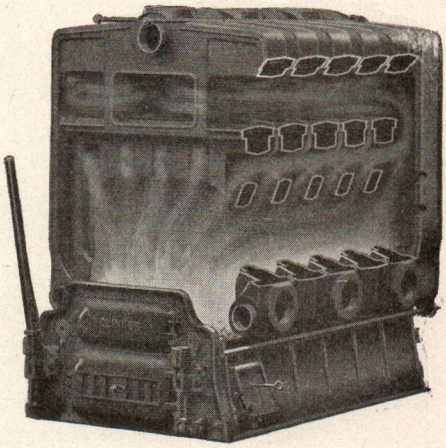


Fig. 10703B

STEAM

No. of Boiler	Total Length Inches	Height Inches	Width Inches	Height of Water Line Inches	Coal Capacity Cubic Feet	Size of Smoke Collar Inches	No. and Size of Outlets and Inlets Inches	Size of Base Inches	8 Hour Ratings Square Feet	Price Each
255	55	73	49½	49	8.37	12	2—4	35x37¼	1100	**430.00**
256	63	73	49½	49	10.45	12	2—4	35x45¼	1350	**505.00**
257	71	73	49½	49	12.53	12	3—4	35x53¼	1600	**580.00**
258	79	73	49½	49	14.62	12	3—4	35x61¼	1850	**655.00**

Measurements include trimmings.

WATER

No. of Boiler	Total Length Inches	Height Flow Openings Inches	Width Inches	Coal Capacity Cubic Feet	Size of Smoke Collar Inches	No. and Size of Outlets and Inlets Inches	Size of Base Inches	8 Hour Ratings Square Feet	Price Each
255	55	58⅝	39 1/16	8.37	12	2—4	35x37¼	1825	**420.00**
256	63	58⅝	39 1/16	10.45	12	2—4	35x45¼	2225	**495.00**
257	71	58⅝	39 1/16	12.53	12	3—4	35x53¼	2650	**570.00**
258	79	58⅝	39 1/16	14.62	12	3—4	35x61¼	3050	**645.00**

Use a larger boiler for soft coal.

Do not bush flow-pipe outlets but connect them full size to the mains.

CAPITOL SECTIONAL BOILERS

180-200 SERIES

STEAM

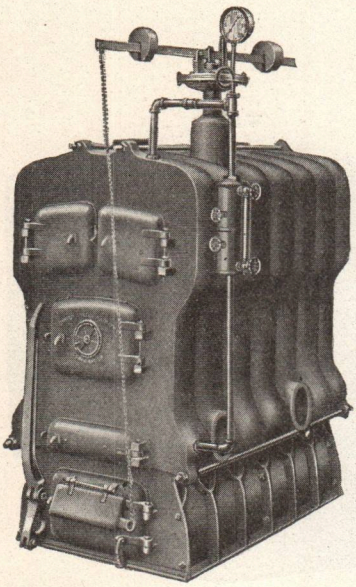


Fig. 346A

WATER

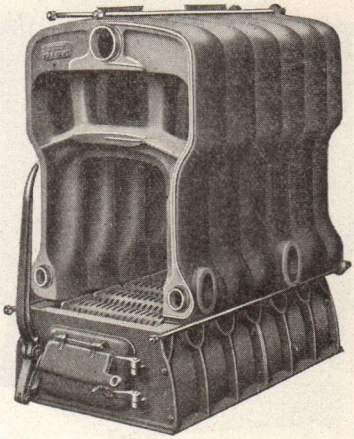


Fig. 346B

STEAM

No. of Boiler	Total Length Inches	*Height Inches	*Width Inches	Height Water Line Inches	Coal Capacity Cu. Ft.	Smoke Collar Inches	Outlets and Inlets Inches	Base Inches	8 Hour Rating Sq. Ft.	Price
184	38	65	36¾	40½	2.33	10	2—3	25½x20¼	400	**208.00**
185	45	65	36¾	40½	3.17	10	2—3	25½x26½	550	**245.00**
186	51	65	36¾	40½	4.01	10	2—3	25½x32¾	700	**310.00**
187	57	65	36¾	40½	4.84	10	2—3	25½x39	850	**355.00**
204	39¼	67½	45	46½	4.36	10	2—3	29 x23¾	600	**259.00**
205	45½	67½	45	46½	5.85	10	2—3	29 x30	800	**340.00**
206	51¾	67½	45	46½	7.34	10	2—3	29 x36¼	1000	**400.00**
207	57	67½	45	46½	8.83	10	3—3	29 x42½	1200	**460.00**

*Measurements include trimmings.

WATER

184	38	48	28½	....	2.33	10	2—3	25½x20¼	650	**198.00**
185	45	48	28½	....	3.17	10	2—3	25½x26½	910	**235.00**
186	51	48	28½	....	4.01	10	2—3	25½x32¾	1170	**300.00**
187	57	48	28½	....	4.84	10	2—3	25½x39	1430	**345.00**
204	39¼	54	32½	....	4.36	10	2—3	29 x23¾	1000	**249.00**
205	45½	54	32½	....	5.85	10	2—3	29 x30	1300	**330.00**
206	51¾	54	32½	....	7.34	10	2—3	29 x36¼	1650	**390.00**
207	57	54	32½	....	8.83	10	3—3	29 x42½	2000	**450.00**

Use a larger boiler for soft coal.
Do not bush flow-pipe outlets but connect them full size to the main.

CAPITOL-WINCHESTER BOILERS

STEAM

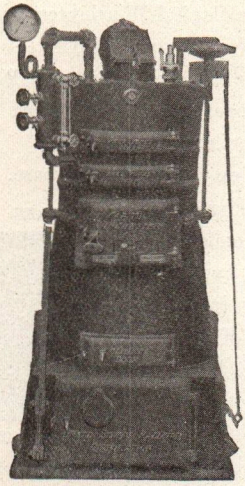


Fig. 5021A

WATER

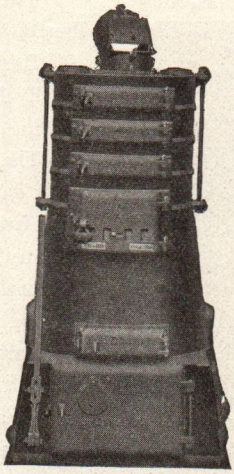


Fig. 5021B

The Capitol-Winchester Boiler is probably the first steam or hot water boiler to contain a Rotary-Duplex grate. This grate is made in two sections. The outer ring rotates on ball bearings, thus doing away entirely with the removal of clinkers through a clinker door. The central section is composed of two hand-like bars. A quarter turn of the shaker operates these bars, cutting out ashes and allowing the live coals to settle down. All mechanism in this new grate is encased and may be taken out as a unit by removing front base plate. The simple shaking operation is accomplished with the doors shut. This eliminates any possibility of dust, dirt or gas escaping into the upper rooms of the house.

ROTARY-DUPLEX GRATE

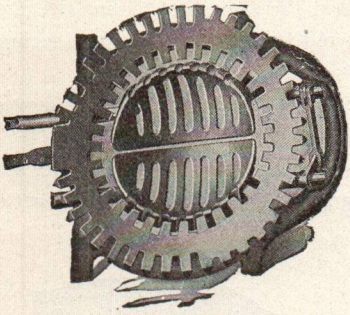


Fig. 5021C

Experience has proven that a deep fire pot is necessary to carry sufficient fire over night for quick rekindling in the morning, and to allow the boiler to develop full efficiency with an 8-hour firing period.

The waterways in the Capitol-Winchester Boiler are large and unobstructed, thereby insuring a rapid circulation and a steady even water line.

The smoke flues are large, and staggered in such a manner that the heated gases of combustion come in contact with all heating surfaces while passing from the fire pot to the chimney.

The steam boiler is equipped with an automatic damper regulator, steam gauge, safety valve, water column, gauge glass and try cocks. No trimmings are furnished with water boilers.

CAPITOL-WINCHESTER BOILERS

SECTIONAL VIEW

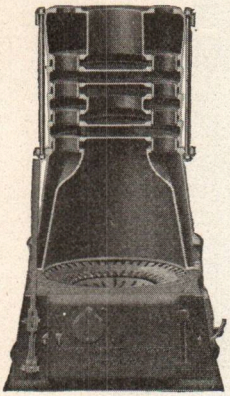


Fig. 340A

The sectional view of the Capitol-Winchester Boiler clearly illustrates the constructional features of the boiler.

BASE.—The base of the Capitol-Winchester Boiler is unusually deep, so as to accommodate the rotary duplex grate with which thirteen sizes of these boilers are equipped.

The draft door is placed on the side of the base. The butterfly damper for this draft door is hung from the center, which makes it sensitive for operation by a thermostatic regular. Aside from this, its position on the side of the base permits the regulator chain to be free from the swing of the fire and ash doors.

BASE

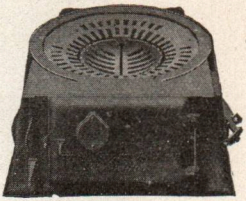


Fig. 340B

GRATE.—The rotary duplex grate, with which all but the three larger sizes of boilers are equipped, consists of two parts—an outer ring section, having a slight pitch towards the center and rotating on steel ball bearings, and an inner section made of two parts, which, when in position, form a basket center.

The latest development of this already efficient grate consists of an operating device which permits the operator to sift the ashes through the grate while standing in an upright position and with all doors closed. The agitation of the outer ring section riddles the fine ash, leaving in the fire pot all unburned coal, and at the same time cleans the fire nearest the effective heating surface of the fire pot, where there is a tendency for the fire to die out first.

A quarter turn of the dumping handle operates the basket-like center, which removes all clinkers.

The three larger sizes of steam and water boiler, viz.: The 3600 and 4600 Series are equipped with rocking grates, consisting primarily of grate frame and five rocking grate bars.

The grates can be removed or installed through the fire door of the boiler.

The construction of the rocking grates is such that clinkers cannot cause the grate bars to jump out of place.

While any grades of hard or soft coal can be used, yet the rocking grates are well adapted to the use of the smaller grades of bituminous or anthracite coal.

GRATE

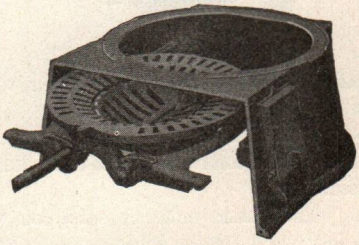


Fig. 340C

CAPITOL-WINCHESTER BOILERS

STEAM

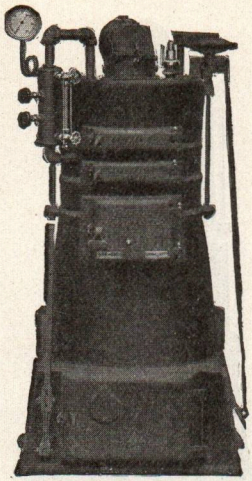


Fig. 5734A

No.	8-Hour Rating Square Feet	Actual Grate Diam. Inches	Grate Area Square Feet	Height Water Line Inches	Height Outlets Inches	Outlets and Inlets Inches	Smoke Pipe Inches	Price
3130	200	15	1.23	44½	49 3/16	2—2½	6	**114.00**
3140	225	15	1.23	48¾	53 9/16	2—2½	6	**123.00**
3230	250	17	1.58	45	49½	2—2½	7	**132.00**
3240	300	17	1.58	50	54 1/16	2—2½	7	**149.50**
3330	325	20	2.18	44¾	49 15/16	2—2½	7	**158.00**
3340	375	20	2.18	49¾	54¾	2—2½	7	**180.00**
3350	425	20	2.18	54¾	59 9/16	2—2½	7	**199.50**
3440	500	24½	3.27	51½	56⅛	2—3	8	**219.50**
3450	575	24½	3.27	56½	61	2—3	8	**240.00**
*3460	650	24½	3.27	61½	65 13/16	2—3	8	**287.50**
3540	750	29	4.59	53½	57 9/16	2—4	9	**317.00**
3550	850	29	4.59	58⅝	62 7/16	2—4	9	**346.00**
*3560	950	29	4.59	63¾	67 5/16	2—4	9	**375.00**
3640	1100	33	5.94	55	59 1/16	2—4	10	**420.00**
3650	1225	33	5.94	60⅛	63 15/16	2—4	10	**455.00**
*3660	1350	33	5.94	65¼	68 13/16	2—4	10	**492.00**

Boiler trimmings extend 16 inches above outlet.

Use a larger size fire pot for soft coal.

*Strong draft is necessary when these are used with soft coal.

Nos. 3600 and 4600 series boilers are equipped with rocking grates only.

CAPITOL-WINCHESTER BOILERS

WATER

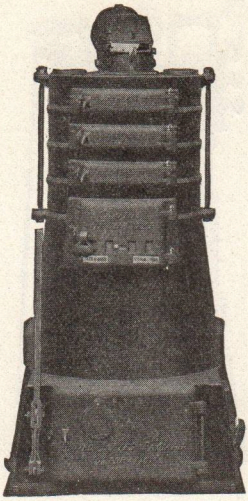


Fig. 5720A

No.	8-Hour Rating Square Feet	Actual Grate Diam. Inches	Grate Area Square Feet	Height Outlets Inches	Outlets and Inlets Inches	Smoke Pipe Inches	Price
4130	325	15	1.23	43 15/16	2—2½	6	**96.50**
4140	375	15	1.23	47 15/16	2—2½	6	**105.50**
4230	425	17	1.58	44¼	2—2½	7	**123.00**
4240	500	17	1.58	48 13/16	2—2½	7	**140.50**
4330	550	20	2.18	44 11/16	2—2½	7	**153.50**
4340	625	20	2.18	49½	2—2½	7	**171.00**
4350	700	20	2.18	54 5/16	2—2½	7	**191.00**
4440	825	24½	3.27	50⅞	2—3	8	**210.50**
4450	950	24½	3.27	55¾	2—3	8	**230.00**
*4460	1075	24½	3.27	60 9/16	2—3	8	**277.50**
4540	1225	29	4.59	52 5/16	2—4	9	**303.00**
4550	1400	29	4.59	57 3/16	2—4	9	**336.00**
*4560	1575	29	4.59	62 1/16	2—4	9	**365.00**
4640	1825	33	5.94	53 13/16	2—4	10	**410.00**
4650	2025	33	5.94	58 11/16	2—4	10	**442.00**
*4660	2225	33	5.94	63 9/16	2—4	10	**482.00**

Use a larger size fire pot for soft coal.

*Strong draft is necessary when these are used with soft coal.

Nos. 3600 and 4600 series boilers are equipped with rocking grates only.

CAPITOL BOILERS

GUARANTEE, RATINGS, ETC.

GUARANTEE.—The published ratings of Capitol Boilers are absolutely guaranteed, provided the radiation in each case is ample for the requirements of the building, the piping of sufficient size and properly run, the boiler connected to a flue of ample capacity and good draft, suitable grade of fuel used, and the apparatus operated in accordance with our printed instructions. This guarantee does not apply when only a portion of a building is to be heated, nor when the radiation installed is insufficient to heat the building to 70 degrees in zero weather and is based on the use of hard coal only for fuel. A larger boiler should be used for soft coal or wood.

CONSTRUCTION.—We guarantee that Capitol Boilers shall be in perfect order when delivered to the transportation company at point of shipment, and in case there is any defect of material or workmanship in any boiler or part thereof furnished by us, we agree to promptly supply a new part, free of charge, and deliver it by freight at the place where such defective boiler or part may be, but we will not be responsible for any damage to goods in transit, or from careless handling, and in no case will bills for work on repairs be allowed.

RATINGS.—The ratings of steam boilers are based on the radiation being sufficient to heat the building to the required temperature, with pressure not to exceed 2 pounds at the boiler. The ratings of water boilers are based on a standard water temperature of 180 degrees as it leaves the boiler. Our ratings are for direct cast iron radiation. Indirect radiation adds 50 per cent to the drain on the boiler; that is, 1000 feet of indirect radiation is equivalent to 1500 feet of direct.

All boilers should be covered with asbestos plastic cement to an average thickness of at least 1½ inches. When boilers are not so covered the number of square feet of exposed heating surface on them (which can be easily determined from published outside dimensions) should be increased by 75 per cent to obtain the equivalent of cast iron radiating surface. This additional surface should be included in the total drain upon boiler capacity. All ratings provide that in estimating the size of boiler required (all piping, mains and risers—flow and return) should be figured as radiating surface, in addition to the cast iron radiating surface to be used. When a pipe coil is used as a radiator, add 25 per cent to the total number of square feet of surface to obtain the equivalent of cast iron radiation.

If piping in the basement is left uncovered, the equivalent number of square feet of radiating surface it contains should be increased by 75 per cent in computing the size of boiler required. When piping is covered, the loss is somewhat lessened, depending upon the quality and thickness of the covering. While covering results in fuel economy and decrease of heat loss, it is not sufficient to materially influence the required boiler capacity. When a pipe coil or cast iron section is introduced into the fire pot or a steam coil placed in a tank for the purpose of heating water for domestic use, additional capacity should be provided, in estimating size of boiler required, at the rate of 1¼ square feet of direct radiation for steam boiler and 2 square feet for water boiler for each gallon of water to be thus heated per hour.

For economic results we do not recommend the use of a coil in fire pot for heating water, but advise the use of a separate water heater.

LAUNDRY AND TANK HEATERS

No. 119 SUNRAY LAUNDRY AND TANK HEATER

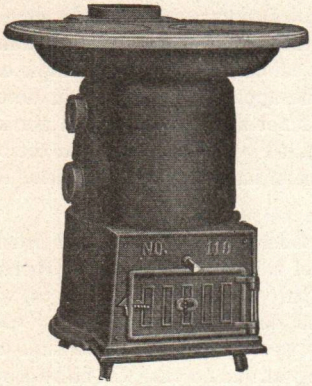


Fig. 3343A

No. 2X LAUNDRY HEATER

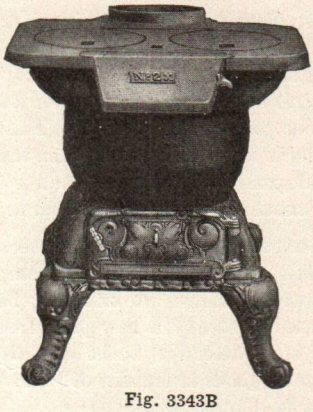


Fig. 3343B

The capacities listed represent the sizes of tanks which experience has shown the heaters will supply for ordinary family use. They are also based on the addition of about 25 degrees temperature to the water per hour, when connected to a tank of ample storage capacity. To determine the capacity of tank heaters in square feet of radiation, divide the capacity in gallons by 1.30.

SUNRAY TANK HEATER

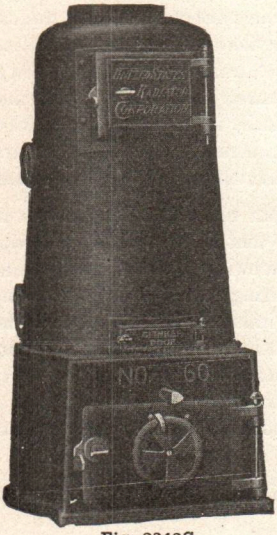


Fig. 3343C

No.	Tank Capacity Gallons	Size of Fire Pot Inches	Price Each
2X	60	10	23.00
119	90	10	30.00
120	150	12	40.00
62	200	13	50.00
63	250	13	60.00
....	....	....	....

No. 120 heater has round top.

HOT WATER STORAGE TANKS

HORIZONTAL OR VERTICAL

WITH OR WITHOUT STEAM COIL

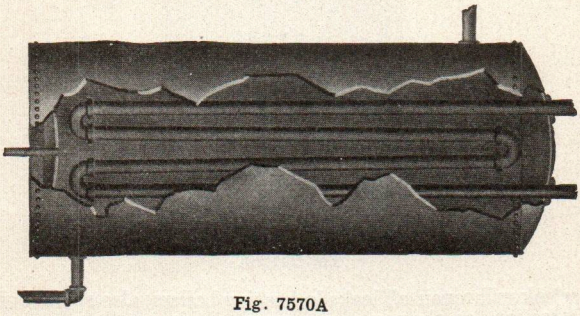


Fig. 7570A

All standard storage tanks are tested to a hydrostatic pressure of 100 pounds to the square inch and are guaranteed for a working pressure of 65 pounds per square inch.

Diam. Inches	Length Feet	Approx. Capacity Gallons	Standard Openings Inches	Price Tank Only	Number and Size of Coil Pipes	Price Black Coil	Price Galv. Coil
20	4	66	1½	**87.00**	4 pipes 1 in.	**29.00**	**35.00**
20	5	85	1½	**94.00**	4 " 1 "	**30.50**	**38.50**
24	4	100	1½	**102.00**	4 " 1¼ "	**35.50**	**42.00**
24	5	120	1½	**112.00**	4 " 1¼ "	**37.00**	**45.00**
24	6	140	1½	**122.00**	4 " 1¼ "	**38.50**	**48.00**
30	4	150	2	**134.00**	4 " 1¼ "	**35.50**	**42.00**
30	5	180	2	**147.00**	4 " 1¼ "	**37.00**	**45.00**
30	6	220	2	**157.00**	4 " 1¼ "	**38.50**	**48.00**
30	7	250	2	**176.00**	4 " 1¼ "	**40.00**	**51.00**
30	8	295	2	**197.00**	4 " 1¼ "	**41.50**	**54.00**
36	6	315	2	**203.00**	4 " 1½ "	**51.00**	**62.00**
36	7	365	2	**228.00**	4 " 1½ "	**54.00**	**66.00**
36	8	420	2	**248.00**	4 " 1½ "	**57.50**	**70.00**
36	10	525	2	**288.00**	4 " 1½ "	**64.00**	**78.00**
42	6	430	2	**265.00**	4 " 1½ "	**51.00**	**62.00**
42	7	500	2	**290.00**	4 " 1½ "	**54.50**	**66.00**
42	8	575	2	**315.00**	4 " 1½ "	**57.50**	**70.00**
42	10	720	2	**363.00**	4 " 1½ "	**64.00**	**78.00**
42	12	865	2	**408.00**	4 " 1½ "	**70.50**	**85.00**
42	14	1000	2	**456.00**	4 " 1½ "	**77.00**	**93.00**

Furnished with or without coils as ordered.

EXTRAS

Price, Manhole in Head.....each		**30.00**
" " " Shell..... "		**45.00**
" Handhole in Head.... "		**8.00**
" " " Shell..... "		**8.00**
" Flanged Openings, 2-in. "		**8.00**
Price, Flanged Openings, 2½ in., each		**8.00**
" " " 3 " "		**9.00**
" " " 3½ " "		**9.00**
" " " 4 " "		**10.00**

BOILER NEVERLEAK

STOPS LEAKS IN STEAM AND HOT WATER HEATING BOILERS

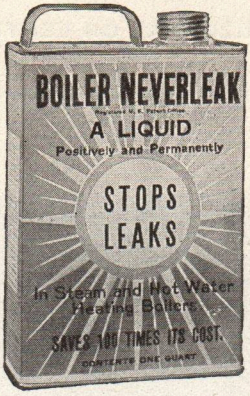


Fig. 25108A

Boiler Neverleak will repair all leaks in heating boilers; also steam boilers below water line, providing directions on the can are followed. It is equally effective in both tubular and cast boilers.

It will stop all leaks in from 30 minutes to 1 hour's time, thus permitting continuous use of the boiler. It is not guaranteed, however, to stop leaks in boilers above water line.

A very old boiler, which was practically rusted out in several of the sections, has been repaired with boiler Neverleak. Boilers in this condition require a moderate increase in the quantity of Neverleak used. This enables Boiler Neverleak to coat the waterways of the boiler, thereby preventing what is known among the trade as rust pit leaks.

Boiler Neverleak does not crystalize under fire. It is not necessary to know what sections of tubes are leaking, nor lose the use of the boiler. Simply pour in the Boiler Neverleak, and within 1 hour's time the boiler is repaired. Boiler Neverleak will not deteriorate nor lose its efficiency so long as can is kept tightly corked.

QUANTITY TABLE STEAM BOILERS

Manufacturers' Rating	Quantity of Neverleak
100 to 1000 Square Feet	1½ quarts
1000 " 2000 "	3 "
2000 " 4000 "	4 "
4000 " 6000 "	5 "
6000 " 8000 "	7 "
8000 " 10000 "	8 "

For larger boilers use 1 additional quart of Boiler Neverleak for each 1500 to 2000 feet capacity. For low pressure tubular steam boilers increase Boiler Neverleak 50 per cent over quantity given in the table.

Quantity table is based on from one to three cracks or leaks; should boiler have more than this, or should cracks be very large, increase the quantity used. If cracks are opened and water leaks so fast as to put out the fire fill the cracks with iron cement before pouring in Boiler Neverleak.

Price, 1-quart Cans	each	**6.00**
" Half-gallon Cans	"	**10.00**
" Gallon Cans	"	**18.00**

CAST IRON RADIATORS

SINGLE COLUMN, FOR STEAM OR WATER

NEW FLORENTINE
ORNAMENTAL

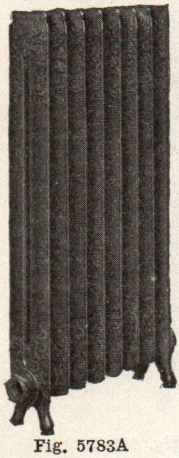


Fig. 5783A

TRITON
PLAIN

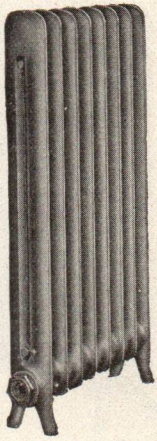


Fig. 5783B

No. of Sections	*Length Inches	Heating Surface, Square Feet				
		38 In. High 3 Sq. Ft. per Section	32 In. High 2½ Sq. Ft. per Section	26 In. High 2 Sq. Ft. per Section	22 In. High 1⅔ Sq. Ft. per Section	20 In. High 1½ Sq. Ft. per Section
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½

*Add ½ inch for each bushing to get total length measurement of radiators.
Above radiators are tapped 2 inches and bushed.
Distance from floor to center of tapping: Water, 4½ inches; steam, 4 inches.
Width of section, 4½ inches, width of legs, $5\frac{1}{32}$ inches.

CAST IRON RADIATORS

TWO-COLUMN, FOR STEAM OR WATER

NEW FLORENTINE ORNAMENTAL

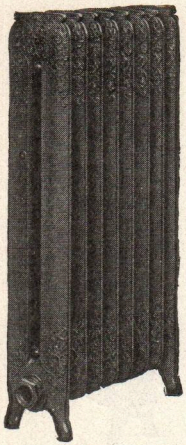


Fig. 5784A

TRITON PLAIN

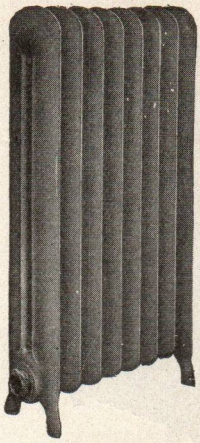


Fig. 5784B

No. of Sections	*Length Inches	Heating Surface, Square Feet						
		45 In. High 5 Sq. Ft. per Section	38 In. High 4 Sq. Ft per Section.	32 In. High 3⅓ Sq. Ft. per Section	26 In. High 2⅔ Sq. Ft. per Section	22 In. High 2¼ Sq. Ft. per Section	20 In. High 2 Sq. Ft. per Section	15-inch† 1½ Sq. Ft. per Section
2	5	10	8	6⅔	5⅓	4½	4	3
3	7½	15	12	10	8	6¾	6	4½
4	10	20	16	13⅓	10⅔	9	8	6
5	12½	25	20	16⅔	13⅓	11¼	10	7½
6	15	30	24	20	16	13½	12	9
7	17½	35	28	23⅓	18⅔	15¾	14	10½
8	20	40	32	26⅔	21⅓	18	16	12
9	22½	45	36	30	24	20¼	18	13½
10	25	50	40	33⅓	26⅔	22½	20	15
11	27½	55	44	36⅔	29⅓	24¾	22	16½
12	30	60	48	40	32	27	24	18
13	32½	65	52	43⅓	34⅔	29¼	26	19½
14	35	70	56	46⅔	37⅓	31½	28	21
15	37½	75	60	50	40	33¾	30	22½
16	40	80	64	53⅓	42⅔	36	32	24
17	42½	85	68	56⅔	45⅓	38¼	34	25½
18	45	90	72	60	48	40½	36	27
19	47½	95	76	63⅓	50⅔	42¾	38	28½
20	50	100	80	66⅔	53⅓	45	40	30
21	52½	105	84	70	56	47¼	42	31½
22	55	110	88	73⅓	58⅔	49½	44	33
23	57½	115	92	76⅔	61⅓	51¾	46	34½
24	60	120	96	80	64	54	48	36
25	62½	125	100	83⅓	66⅔	56¼	50	37½

*Add ½ inch for each bushing to get total length measurement of radiators.
†Plain only.
Above radiators are tapped 2 inches and bushed.
Distance from floor to center of tapping: Water, 4½ inches; steam, 4 inches.
Width of section, 7⅛ inches; width of legs, 7 13/32 inches.

CAST IRON RADIATORS

THREE-COLUMN, FOR STEAM OR WATER

NEW FLORENTINE
ORNAMENTAL

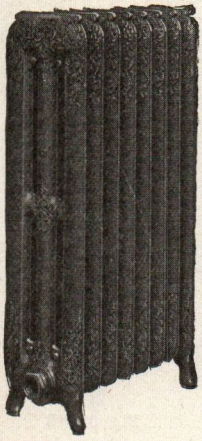


Fig. 5785A

TRITON
PLAIN

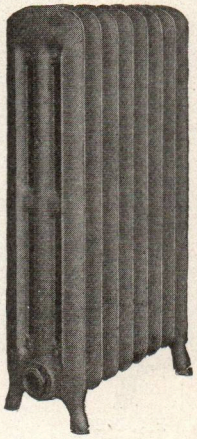


Fig. 5785B

No. of Sections	*Length Inches	Heating Surface, Square Feet					
		45 In. High 6 Sq. Ft. per Section	38 In. High 5 Sq. Ft. per Section	32 In. High 4½ Sq. Ft. per Section	26 In. High 3¾ Sq. Ft. per Section	22 In. High 3 Sq. Ft. per Section	18 In. High 2¼ Sq. Ft. per Section
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼

*Add ½ inch for each bushing to get total length measurement of radiator.
Above radiators are tapped 2 inches and bushed.
Distance from floor to center of tapping: Water, 4½ inches; steam, 4 inches.
Width of section, 9 inches; width of legs, 9 5/16 inches.

CAST IRON RADIATORS

FOUR-COLUMN, FOR STEAM OR WATER

NEW FLORENTINE
ORNAMENTAL

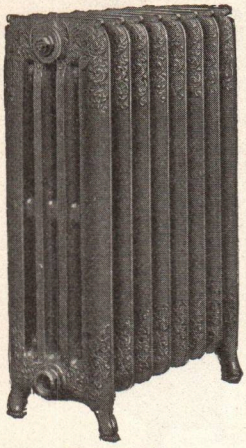


Fig. 5786A

TRITON
PLAIN

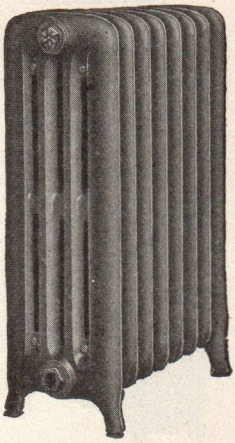


Fig. 5786B

No. of Sections	*Length Inches	Heating Surface, Square Feet					
		44 In. High 10 Sq. Ft. per Section	38 In. High 8½ Sq. Ft. per Section	32 In. High 7 Sq. Ft. per Section	26 In. High 5½ Sq. Ft. per Section	22 In. High 4½ Sq. Ft. per Section	18 In. High 3½ Sq. Ft. per Section
2	6	20	17	14	11	9	7
3	9	30	25½	21	16½	13½	10½
4	12	40	34	28	22	18	14
5	15	50	42½	35	27½	22½	17½
6	18	60	51	42	33	27	21
7	21	70	59½	49	38½	31½	24½
8	24	80	68	56	44	36	28
9	27	90	76½	63	49½	40½	31½
10	30	100	85	70	55	45	35
11	33	110	93½	77	60½	49½	38½
12	36	120	102	84	66	54	42
13	39	130	110½	91	71½	58½	45½
14	42	140	119	98	77	63	49
15	45	150	127½	105	82½	67½	52½
16	48	160	136	112	88	72	56
17	51	170	144½	119	93½	76½	59½
18	54	180	153	126	99	81	63
19	57	190	161½	133	104½	85½	66½
20	60	200	170	140	110	90	70
21	63	210	178½	147	115½	94½	73½
22	66	220	187	154	121	99	77
23	69	230	195½	161	126½	103½	80½
24	72	240	204	168	132	108	84
25	75	250	212½	175	137½	112½	87½

*Add ½ inch for each bushing to get total length measurement of radiators.
Above radiators are tapped 2 inches and bushed.
Distance from floor to center of tapping, 4½ inches.
Width of section, 12½ inches; width of legs, 12 13/16 inches.

CAST IRON RADIATORS

FIVE-COLUMN WINDOW, STEAM OR WATER

TRITON . PLAIN

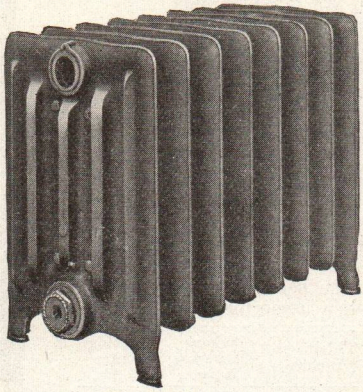


Fig. 5787A

No. of Sections	*Length Inches	Heating Surface, Square Feet		
		20 In. High 5½ Sq. Ft. per Section	17 In. High 4¾ Sq. Ft. per Section	14 In. High 4 Sq. Ft. per Section
2	6	11	9½	8
3	9	16½	14¼	12
4	12	22	19	16
5	15	27½	23¾	20
6	18	33	28½	24
7	21	38½	33¼	28
8	24	44	38	32
9	27	49½	42¾	36
10	30	55	47½	40
11	33	60½	52¼	44
12	36	66	57	48
13	39	71½	61¾	52
14	42	77	66½	56
15	45	82½	71¼	60
16	48	88	76	64
17	51	93½	80¾	68
18	54	99	85½	72
19	57	104½	90¼	76
20	60	110	95	80
21	63	115½	99¾	84
22	66	121	104½	88
23	69	126½	109¼	92
24	72	132	114	96
25	75	137½	118¾	100

*Add ½ inch for each bushing to get total length measurement of radiators.
Above radiators are tapped 2 inches and bushed.
Distance from floor to center of tapping, 3½ inches.
Width of section, 13 inches; width of legs, 13 inches.

CAST IRON WALL RADIATORS

STYLE A

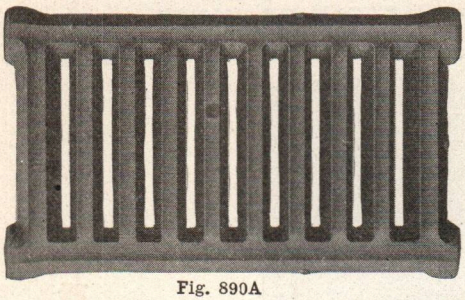


Fig. 890A

STYLE B

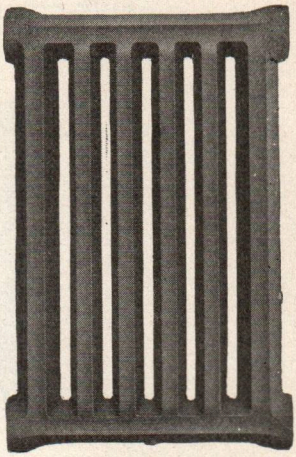


Fig. 890B

Wall radiators should always be assembled with bars vertical, whether sections are built in stacks or tiers. Style A are used when sections are assembled end to end, and Style B when assembled side by side.

Section Numbers	Height Inches	Width Inches	Thickness Inches	Thickness with Brackets Inches	Heating Surface Sq. Ft.
5A	14⅛	16½	3	3½	5
7A	14⅛	22⅞	3	3½	7
9A	14⅛	29¼	3	3½	9
7B	22⅞	14⅛	3	3½	7
9B	29¼	14⅛	3	3½	9

WALL RADIATOR BRACKETS

Brackets B to fit over a 9½-inch high baseboard for supporting Style B wall radiators.

Brackets A to fit over baseboard for supporting Style A wall radiators.

B-5½.	Height	from	floor	to	center	of	tapping,	5½	inches;	fits	9½-inch	baseboard.
B-7½.	"	"	"	"	"	"	"	7½	"	"	9½	" "
B-9½.	"	"	"	"	"	"	"	9½	"	"	9½	" "
A-6.	"	"	"	"	"	"	"	6	"	"	1½	" "
A-8.	"	"	"	"	"	"	"	8	"	"	3½	" "
A-10.	"	"	"	"	"	"	"	10	"	"	5½	" "
A-12.	"	"	"	"	"	"	"	12	"	"	7½	" "
A-14.	"	"	"	"	"	"	"	14	"	"	9½	" "
A-16.	"	"	"	"	"	"	"	16	"	"	11½	" "

Brackets D are straight right angle brackets without offset, for supporting Style B radiators. Distance from floor to center at tapping 5½ inches.

Brackets C are for Style A radiators. Distance from floor to center of tapping, 5½ inches.

Brackets F, G, E and I are screwed to wall, baseboard and wainscoting. F and G are bottom supports for all sizes. E and I, top guides to hold radiator in place, should always be used with F and G brackets.

Ceiling brackets H for supporting radiator from ceilings, made of cast plate 3⅜ inches in diameter, to be screwed to ceiling joists by four screws. Bolt furnished gives a distance of from 3½ to 5 inches from bottom of radiator to ceiling. Other lengths on special order.

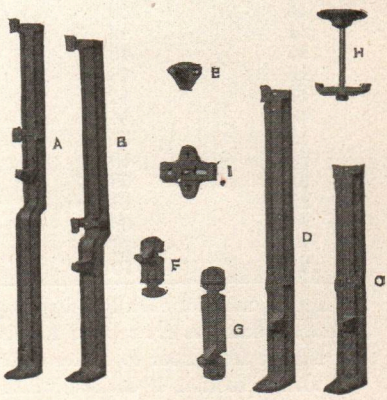


Fig. 890C

WALL RADIATORS

ASSEMBLAGE

WATER ONLY

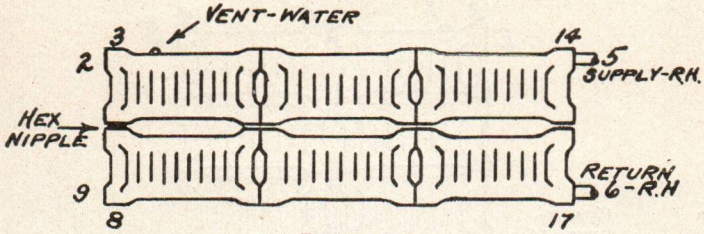


Fig. 751A No. 5

WATER OR ONE AND TWO-PIPE STEAM

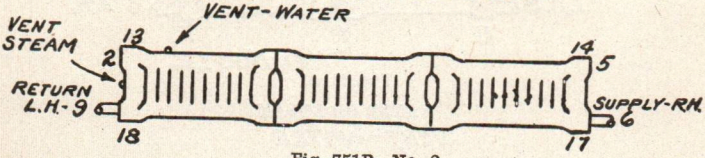


Fig. 751B No. 2

WATER OR ONE AND TWO-PIPE STEAM

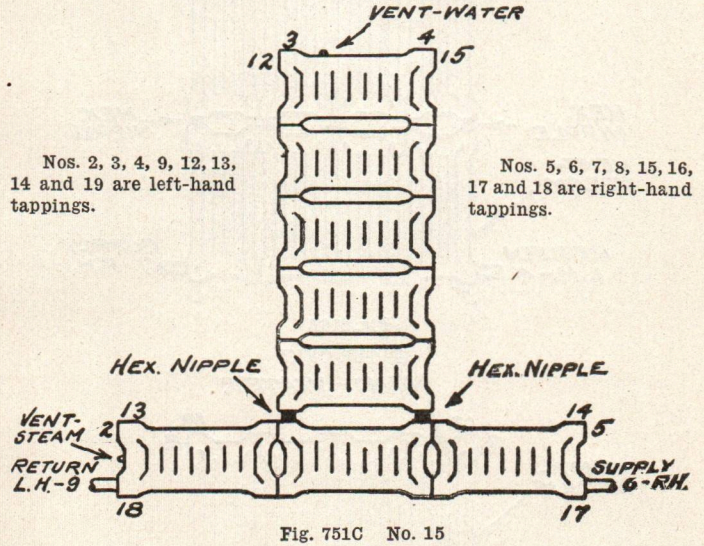


Fig. 751C No. 15

These radiators are tapped 1½ inches supply and return and bushed as required. The regular tappings are indicated by numbers 2, 3, 4, 5, 6, 7, 8 and 9. Numbers 12, 13, 14, 15, 16, 17, 18 and 19 indicate special tappings which can be furnished at points so marked, if required, and for which an extra charge will be made.

WALL RADIATORS

ASSEMBLAGE

WATER OR STEAM

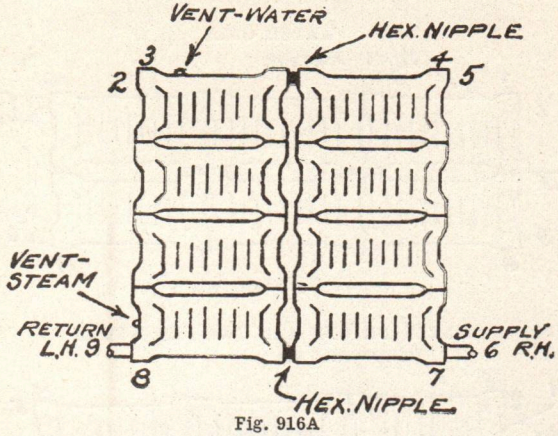


Fig. 916A

WATER OR STEAM

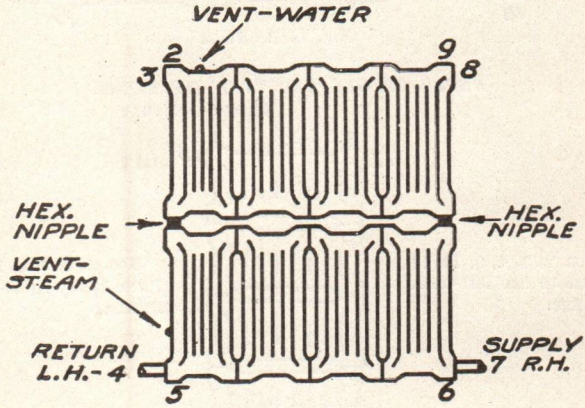


Fig. 916B

WATER ONLY

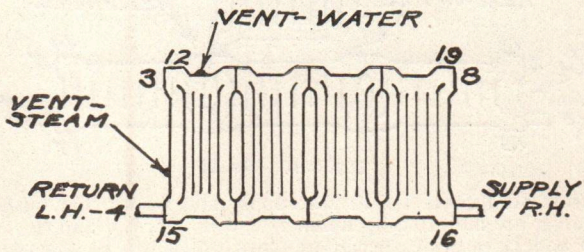


Fig. 916C

WALL RADIATORS

ASSEMBLAGE

WATER OR ONE AND TWO TYPE STEAM

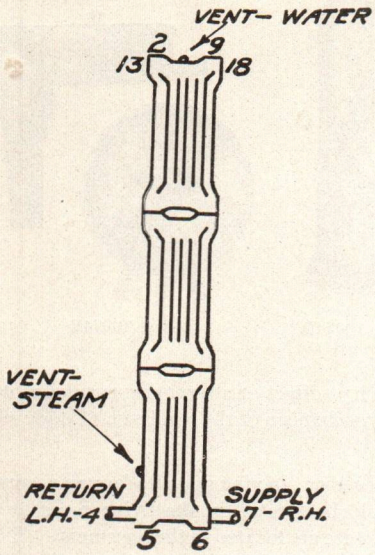


Fig. 918A

WATER OR STEAM

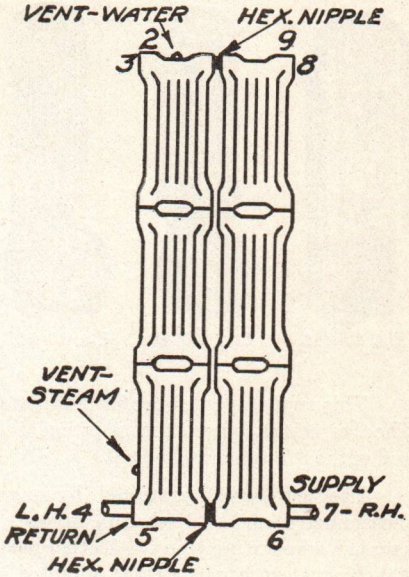
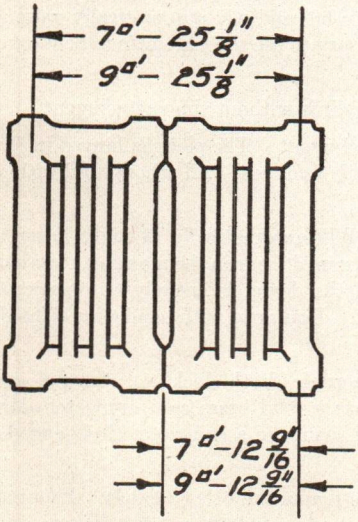
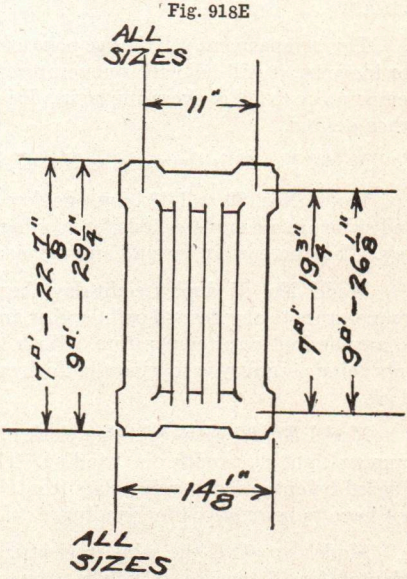


Fig. 918E





Measurements apply to A or B style tappings.

MINNEAPOLIS HEAT REGULATORS

No. 40

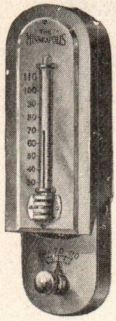


Fig. 10074A

Nos. 39 AND 47

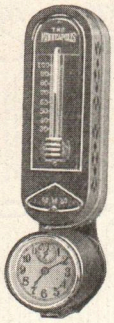


Fig. 10074B

No. 55

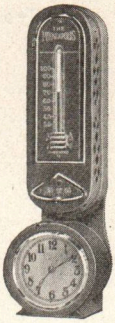


Fig. 10074C

No. 60

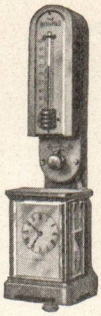


Fig. 10074D

No. 65

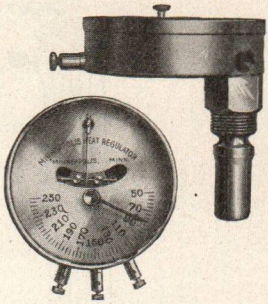


Fig. 10074E

This regulator consists of a thermostat, a gravity, direct or alternating current motor. The thermostat controls the operation of the whole mechanism of the regulator. Made with and without a time attachment.

The thermostat is protected by an ornamental screen, having upon its face an accurate thermometer, and is finished in bronze. It should be located in the living room at an average temperature point. All other parts of the device are located in the basement. Time attachment consists of a clock mounted in connection with the thermostat and of similar finish.

This arrangement will change point of temperature control at any predetermined hour; for instance, it will hold the temperature at night to 60° and will automatically raise the temperature to 70° at the rising hour. It is not necessary to use the time attachment except when desired.

Model No. 40 is the same as No. 47, except that it is without time attachment.

Model Nos. 39 and 47 have one-day clock attachment. The clock is hinged in front and swings in a complete circle for winding. It is easily removed. All arbors wind with one key. The thermostat is small and inconspicuous.

Model No. 55 duplex eight-day thermostat. Will automatically at night lower the temperature to any desired point and at any predetermined hour in the morning, raise same to any desired day temperature. With this model the device is entirely automatic; the only thing necessary is to wind the clock once a week. Equipped with handsome eight-day clock.

Model No. 60 with eight-day clock of very high grade, both clock and alarm of same running eight days with one winding. The clock has a solid brass case, repeater alarm, jeweled balance, and beveled glass front. The clock swings in a complete circle and does not have to be removed for winding.

Model No. 65 is the same in electrical construction as the other models. Especially adapted for the control of valves, dampers, etc., for the regulation of hot water tanks, steam, bake ovens, etc.

MINNEAPOLIS HEAT REGULATORS

GRAVITY MOTOR

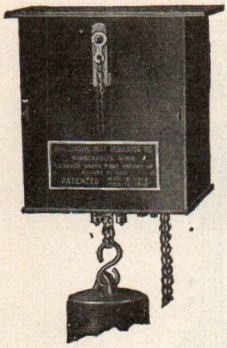


Fig. 10075A

SPRING MOTOR

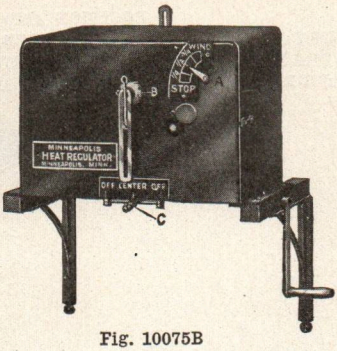


Fig. 10075B

DIRECT CURRENT MOTOR

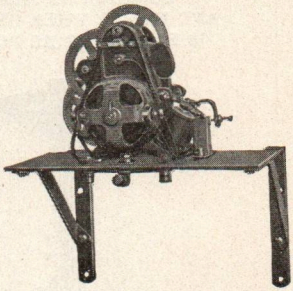


Fig. 10075C

Gravity Motor

Designed to be fastened to the ceiling of the basement. Is enclosed in a pressed steel case, finished in black enamel, baked. The power is furnished by an iron weight, which is of ample size to lift all dampers on the modern types of furnaces, and no special expensive dampers are necessary. All motors, when run down, automatically leave the drafts closed.

Two cells of open circuit battery are used, and as no work is required of the battery except releasing the motor, and it is in service only a second at a time, it will last a number of years.

Spring Motor

The spring motor is encased in a solid pressed steel cover, No. 22 gauge, finished in black enamel, baked. There is an index finger with scale which travels as the motor is wound and unwound, a glance at the motor showing at all times the condition in reference to winding. The cover is dustproof. The motor is also provided with basement switch by means of which the motor can be operated in the basement at will. Easily wound by means of a crank key.

Direct Current Motor

This motor has ample power and is capable of handling the heaviest work that a heat regulator can be put to. Power is furnished by four ary cells which have ample power to operate the device for a full heating season. A new set of dry cells should be installed each fall. Aside from replenishing the batteries and oiling once a year it requires no attention. All shafts run in finely adjusted brass bushings and motor is as finely adjusted as a high priced clock. Motor is encased in a dustproof, 22 gauge steel cover, handsomely finished in black enamel. Furnished with basement switch by which it may be operated at will in the basement.

Alternating Current Motor

Designed to operate directly from the house lighting circuit. Connect directly to lighting circuit and turn on power. Operates with 110-volt, 60-cycle alternating current, but a small transformer is mounted on bottom of the case and this cuts down the voltage of the current which operates the thermostat and magnet coils. This makes the installation very simple, as the motor and transformer are complete in one unit.

Regulators Number	Time Attachment	Price, Each			
		Gravity Motor	Spring Motor	D. C. Motor	A. C. Motor
39	One-Day Clock	39.00	....	....	....
40	None	....	40.00	50.00	60.00
47	One-Day Clock	....	47.00	57.00	67.00
55	Duplex	....	55.00	65.00	75.00
60	Eight-Day Clock	....	60.00	70.00	80.00
65	Hot Water Regulator	....	65.00	75.00	85.00

Thermometer to repair above Thermostats, each, 1.30.

Above prices include wire, hardware and directions ready to install. Shipping weight, approximately 25 pounds.

HONEYWELL HEAT GENERATORS

POSITION OF MERCURY AND WATER WHEN GENERATOR IS PRODUCING NO PRESSURE

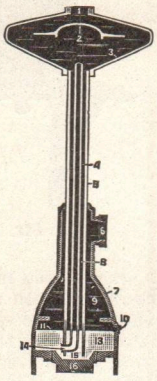


Fig. 3962A

POSITION AND ACTION OF MERCURY AND WATER WHEN GENERATOR IS IN COMPLETE OPERATION PRODUCING 10 POUNDS PRESSURE

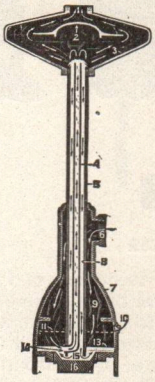
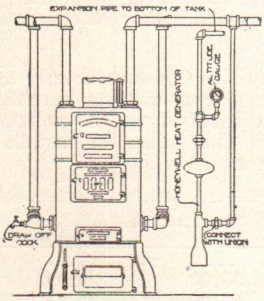


Fig. 3962B

These generators are designed to meet the demand for a device to quicken the circulation in hot water heating jobs.

When connected to the expansion pipe of an ordinary gravity plant, this generator seals the circuit and permits the generation of a slight pressure up to 10 pounds, at which point it relieves itself through the operation of a mercury seal, eliminating any element of danger.

SHOWING GENERATOR ATTACHED TO HOT WATER BOILER



The pressure created by this generator will remedy any unsatisfactory job of hot water heating where the radiation is insufficient, the piping too small for gravity, the circulation sluggish, causing large fuel consumption, or where the water boils easily from quick firing, providing, of course, the boiler is large enough to supply the heat. It greatly improves jobs which contain long horizontal mains, or where the radiation is all on the first floor.

In new work it permits a reduction in radiation, and smaller piping as advocated in the Honeywell system, the system of low cost and high efficiency. It is positive and automatic, is sold under the strongest guarantee, will last a lifetime, and cannot get out of order.

Number	1	2	3	4
For Radiation ... square feet	1200	2500	3500	10000
Size of Inlet ... inches	¾	1	1¼	1¼
" " Outlet ... "	1	1	1¼	1¼
Price ... each	25.00	35.00	50.00	65.00

WATER FEEDERS AND DAMPER REGULATORS

AUTOMATIC WATER FEEDER WITH IMMERSED VALVE

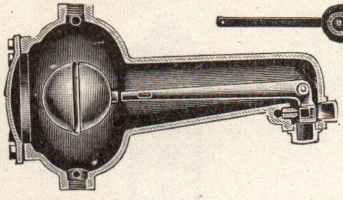


Fig. 4039A

LOW PRESSURE DAMPER REGULATOR

Fig. 4039B

CLARK DAMPER REGULATOR

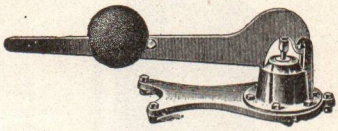


Fig. 4039C

AUTOMATIC WATER FEEDERS AND DAMPER REGULATORS

Price Automatic Water Feeders, with Immersed Valve	each	20.00
" " " " " " " and Gauge	"	24.00
" Low Pressure Damper Regulators	"	5.00
" Extra Rubber Diaphragms	"	.75

CLARK DAMPER REGULATORS

Number		1	2	3
Horse Power		5	20	30 to 500
Price	each	10.00	15.00	25.00
" Extra Diaphragms	"	.55	.85	1.45

IDEAL SYLPHON REGULATORS

Nos. 42 to 44

No. 922

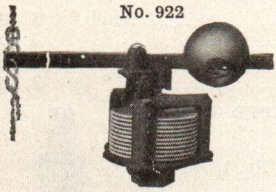


Fig. 4039D

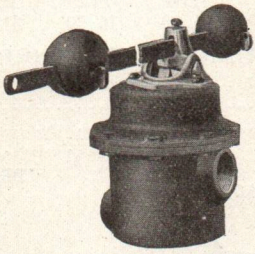


Fig. 4039E

No. 45A

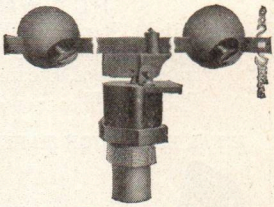


Fig. 4039F

Number	922	42	43	44	45A
Price, with 12 feet of Chain 4 S Hooks and 2 Pulleys, each	20.00	25.00	25.00	25.00	20.00

No. 922 is for steam boilers. Nos. 42 to 45A are for water boilers and tank heaters; No. 42, for temperatures 120° to 180°; No. 43, for 160° to 220°; No. 44, for 190° to 240°; No. 45A, for 120° to 220°.

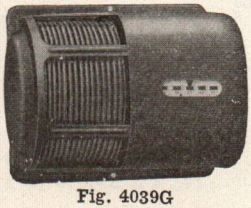


Fig. 4039G

IDEAL SYLPHON REGITHERM

An automatic temperature regulator which operates in response to the slightest change in temperature. It requires no outside agencies, such as electricity, compressed air, or clockwork to help it to perform its functions. Its range of control is from 60 to 80 degrees Fahrenheit, and it can be set at any desired point within these limits. The fuel saved by this regulator will pay its cost in one or two seasons.

Price ..... each 50.00

EXPANSION TANKS, THERMOMETERS, ETC.

GALVANIZED EXPANSION TANKS

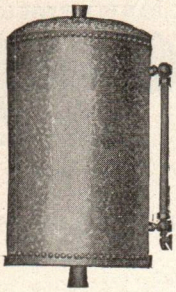


Fig. 6403A

HOT WATER AND STEAM THERMOMETERS

STRAIGHT

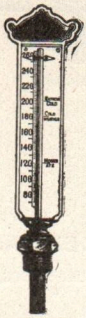


Fig. 6403B

ANGLE

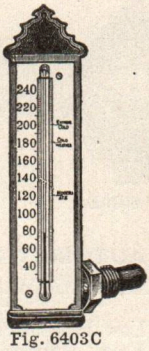


Fig. 6403C

GALVANIZED EXPANSION TANKS

Approximate Capacity . . gallons	8	10	15	20	24	26
Diameter . . . . . inches	10	12	12	14	14	16
Height . . . . . "	20	20	30	30	36	30
Suitable for Radiation . . . sq. ft.	250	350	550	700	850	900
Price, Tank only . . . . . each	**7.50**	**8.00**	**9.00**	**12.50**	**13.00**	**14.00**
Approximate Capacity . . gallons	32	42	66	82	100	120
Diameter . . . . . inches	16	16	18	20	22	24
Height . . . . . "	36	48	60	60	60	60
Suitable for Radiation . . . sq. ft.	1250	1750	2750	4500	6000	7500
Price, Tank only . . . . . each	**15.00**	**16.50**	**31.00**	**37.00**	**51.00**	**58.00**

HOT WATER AND STEAM THERMOMETERS

Price, Straight Stem, Hot Water	each	**3.00**
" Angle, Hot Water	"	**3.50**
" Straight Stem, Steam	"	**3.25**
" Angle, Steam	"	**3.75**

IDEAL EXPANSION TANK BRACKET

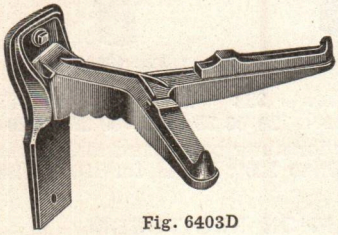


Fig. 6403D

IDEAL SPUD WRENCHES

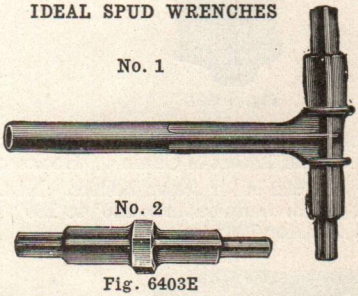


Fig. 6403E

IDEAL EXPANSION TANK BRACKETS

Price, taking Tanks 10 to 16 inches in diameter . . . . . each **1.75**

IDEAL SPUD WRENCHES

Number	1	2
Price, embracing ¾, 1, 1¼ and 1½-inch Sizes . . . . . each	**.75**	**.50**

No. 1 spud wrench has an open hexagon on one end of handle. No. 2 is used with a wrench.

TRAPS AND HUMIDIFIERS

DUNHAM TRAPS

Nos. 1, 2 AND 3

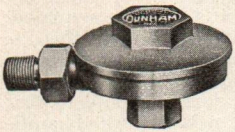


Fig. 29650A

Nos. 4 AND 5

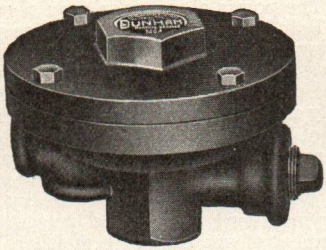


Fig. 29650B

Nos. 13, 14 AND 15

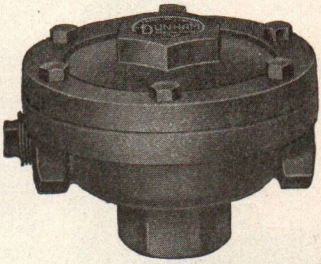


Fig. 29650C

Nos. 1 and 2 traps are used almost exclusively on radiators. The No. 3 trap is used for large radiators, for medium size pipe coils, and is particularly adaptable for dripping risers and short runs of steam piping.

The Nos. 4 and 5 traps are used where traps of large capacity are required on large pipe coils, for dripping main feed risers, and steam mains.

Nos. 13, 14 and 15 are designed for service where pressures are higher than those used in steam heating work.

No.	Style	Capacity per Hour Pounds	Weight Pounds	Weight Ounces	For Pipe Inches	Pressure Pounds	Price Each
1	Radiator	100	....	28	½	10	**8.00**
2	"	350	....	46	½	10	**12.00**
3	"	450	....	53	¾	10	**13.00**
4	Drip	1000	12½	..	¾	10	**18.00**
5	"	2000	21	..	1	10	**30.00**
13	D	100	4	..	½	40	**18.00**
14	D	200	15	..	¼	40	**37.00**
15	D	400	25	..	1	40	**36.00**

BUDDINGTON HUMIDIFIERS

EXTERIOR WITH COVER

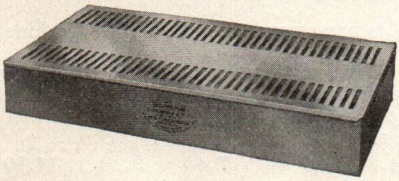
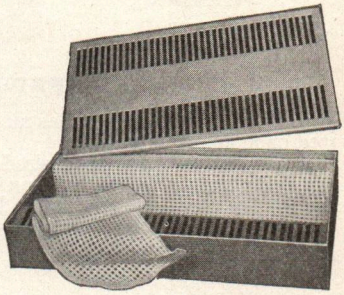


Fig. 29650D

INTERIOR



A device attached on top of radiator coils, to add moisture to dry air in heated rooms. It evaporates gallons where other devices evaporate pints. If the radiator is hot, a Buddington will evaporate a gallon of water in twelve hours.

Length	inches	14	18
Price	each	**2.50**	**3.00**

DOLE PACKLESS RADIATOR VALVES

ANGLE

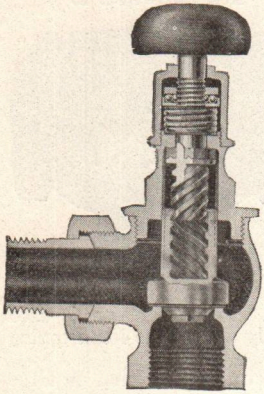


Fig. 5577A

BALL-BEARING

The points of superiority in these valves are as follows: Ball bearings, making them easy of operation and self-locking; a packless disc of special composition, which has been subjected to the most severe tests and proven unequaled; spiral steel spring of high grade steel that will hold the disc firmly under tension; upper bearing for balls, which prevents loss of tension in spring; a heavy one-piece valve stem; a dustproof cap covering vital points; double shoulders that prevent leakage of air, steam or water; patented wood handle that will not chip or crack; heavy valve body with extra heavy standard threads and perfect adjustment and careful alignment of one part with another.

ROUGH BODY, NICKEL-PLATED ALL OVER

Size.....inches	½	¾	1	1¼	1½	2
Price, Angle Valves, with Union. each	3.90	3.90	4.70	6.25	8.15	13.00

GRADUATED VALVE

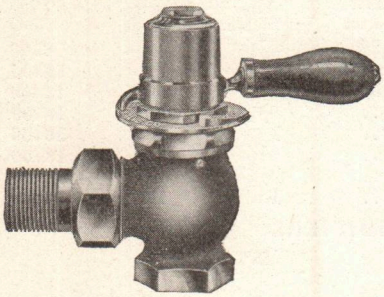


Fig. 5577B

CORNER VALVE

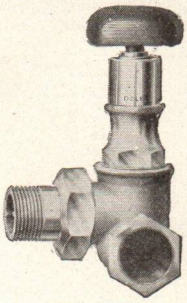


Fig. 5577C

HOT WATER VALVE

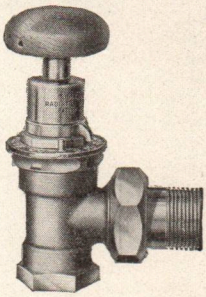


Fig. 5577D

GRADUATED VALVES

The Dole Graduated Valve has all requirements necessary to make a perfect working graduated or modulating valve.

Should any adjustment be desired after the valve is fitted and installed, all that is necessary is to simply loosen octagon nut on top of dial with special wrench which is furnished for the purpose, turn dial to left to the desired point, then tighten nut.

Size.....inches	½	¾	1	1¼	1½	2
Price Rgh. Body, N. P. all over..each	4.15	4.80	5.75	7.40	9.10	14.10

CORNER AND HOT WATER VALVES

These valves are of the same general character as other Dole valves—same high grade workmanship and best of materials. The hot water valve has full opening cylinder and an indicator that shows the exact degree of opening.

Size.....inches	½	¾	1	1¼	1½	2
Price Corner, Rgh. Body, N. P. all over...each	4.25	4.25	5.15	6.95	8.95	14.25
" Hot Water " " " " " .... "	3.90	3.90	4.70	6.25	8.15	13.00

PACKLESS RADIATOR VALVES

LAVIGNE, WITH COMPOSITION DISC, FOR STEAM

WOOD WHEEL PATTERN

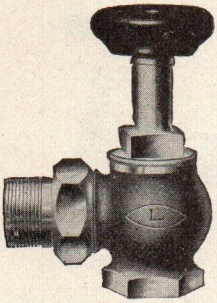


Fig. 8617A

GRADUATED PATTERN

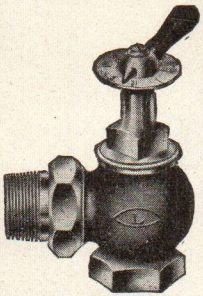
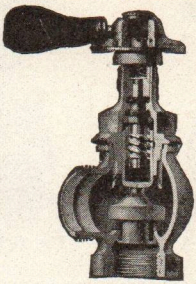


Fig. 8617B

SECTIONAL VIEW



GRADUATED LOCK SHIELD

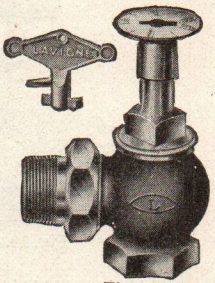


Fig. 8617C

The Lavigne Packless Valve has a number of decided advantages over any other article of its class. Its packless and quick-opening features are simple and efficient and the interior arrangement cannot be injured by ordinary abuse. The bonnet is carried up to the underside of the follower plate to protect the working parts from any outside interference.

By reference to the sectional view, it will be observed that the stem is of the non-rising type and is provided with a flange a short distance above the thread. Between this flange and the inwardly extending flange of the bonnet is placed a specially prepared composition washer. Another similar washer is placed immediately above the inwardly extending flange of the bonnet, and upon this second composition washer rests a gland shaped follower plate extending from the handle. A shoulder is formed on the inside of the follower plate and this shoulder supports a spring which bears upward against a nut screwed to the top of the stem. A double service is performed by this spring, as it bears downward on the upper composition washer and at the same time pulls upward against the lower composition washer, thus holding both of them tightly against the inwardly extending flange of the bonnet and taking up automatically any wear that may occur in either. This insures an absolutely tight joint against water, steam or air.

The valve also has a genuine quick-opening feature, as it can be fully opened or fully closed with about a three-quarter turn of the handle.

The Lavigne Graduated Packless Valve is similar in construction to the valve illustrated and described above, except that it has the additional advantage of a lever handle, an indicator plate graduated into eight sections and means for a special adjustment by which each valve can be accurately set for a wide range of sizes of radiators.

With each graduated valve is furnished four different shells, any one of which may be attached to the disc holder below the disc. If the valve is to be connected to a very small radiator, the shell with a single slot should be used, while if the radiator is medium or large sized, shells with two, three or four slots should be employed. It will remain partly open at any desired position, without any danger of variation of the openings unless the handle is moved.

WITH UNION—ROUGH BODY, PLATED ALL OVER

Size.....inches	½	¾	1	1¼	1½	2
Price, Wood Wheel, Pattern, Angle.....each	3.15	3.80	4.75	6.40	8.10	13.10
" " " Corner..... "	3.45	4.20	5.25	7.05	8.95	14.45
" Graduated Wheel, Angle, with Shells "	3.80	4.50	5.50	7.25	9.00	14.30
" " " Corner " " "	4.10	4.90	6.00	7.90	9.85	15.65
" " " Angle without " "	3.65	4.30	5.25	7.00	8.65	13.90
" " " Corner, " " "	3.95	4.70	5.75	7.65	9.50	15.25

Upon special order, the above valves can be furnished with lock shield. Plated keys, 60 cents list each, extra.

Unless otherwise specified, graduated valves will be shipped with shells.

RADIATOR VALVES AND VALVE WHEELS

RADIATOR VALVES FOR STEAM, COMPOSITION DISC

No. 72 ANGLE

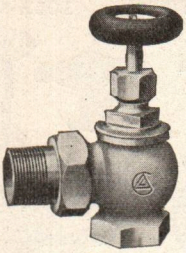


Fig. 19334A

No. 32 R. H. CORNER

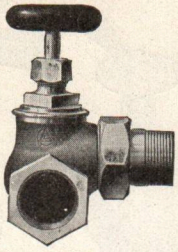


Fig. 19334B

No. 37 L. H. CORNER

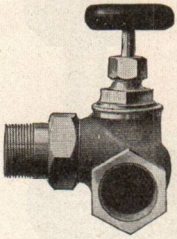


Fig. 19334C

Size ..... inches	½	¾	1	1¼	1½	2
Price, No. 72, Rough Body, Nickel-plated All Over . . each	3.15	3.80	4.75	6.40	8.10	13.10
" " 32 & 37, Rough Body, " " " . . "	3.45	4.20	5.25	7.05	8.95	14.45

No. 373 GATE FOR STEAM OR HOT WATER

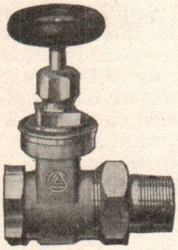


Fig. 19334D

No. 101 BONNETLESS

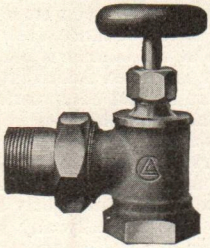


Fig. 19334E

FOR HOT WATER No. 142 QUICK OPENING

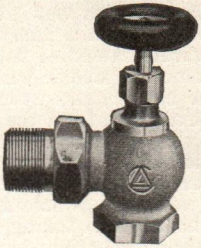


Fig. 19334F

UNION ELBOW

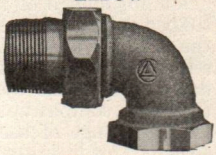


Fig. 19334G

Size ..... inches	½	¾	1	1¼	1½	2
Price, No. 373, Rough Body, Nickel-plated All Over . . each	3.65	4.25	5.20	6.60	9.00	12.80
" " 101, " " " " " . . "	2.40	2.85	3.65	5.05	7.10	10.85
" " 142, " " " " " . . "	2.40	2.85	3.65	5.05	7.10	10.85
" Union Elbows ..... "	1.75	2.00	2.50	3.20	4.00	7.00

WOOD VALVE WHEELS

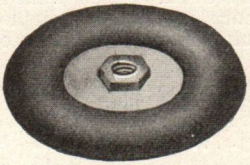


Fig. 19334H

Size of Valves ..... inches	¼	⅜	½	¾
Price, Wood Wheels only ..... each	.10	.10	.10	.10
" " " with Plates and Nuts ..... "	.30	.30	.30	.30
Size of Valves ..... inches	1	1¼	1½	2
Price, Wood Wheels only ..... each	.13	.13	.13	.20
" " " with Plates and Nuts ..... "	.35	.35	.40	.45

HOFFMAN RADIATOR AIR VALVES

The expansive medium of these valves is a volatile or heat-sensitive fluid which is contained in a sealed metal chamber, having flexible diaphragms of phosphor bronze and which entirely vaporize at a temperature a little below that of steam, generating pressure within the chambers that closes the valve.

These valves are made entirely of metal, are absolutely automatic, non-adjustable, fool-proof, and unqualifiedly guaranteed for a period of five years.

There's a Hoffman Venting Valve for every service.

No. 1

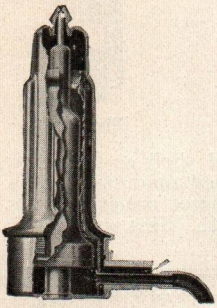


Fig. 17085A

No. 2

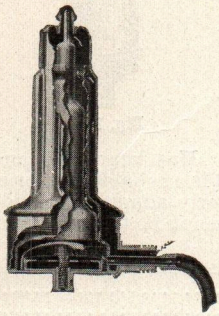


Fig. 17085B

No. 3

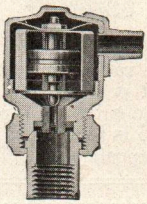


Fig. 17085C

No. 4

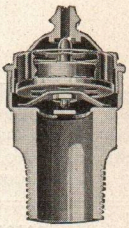


Fig. 17085D

No. 5

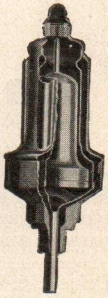


Fig. 17085E

No. 1 SIPHON AIR VALVES

FOR LOW PRESSURE GRAVITY STEAM SYSTEMS

A perfect automatic air valve guaranteed not to leak steam or water. Nothing about it to get out of order or adjustment. Wide open at 190° and closed tightly at 200°, venting the last vestige of heated as well as cold air, insuring a steam-heated radiator clear to the end. Float prevents any spitting or leakage of water. Channels shown in illustration provide separate ways of travel for air and water.

Price.....each **1.90**

No. 2 SIPHON AIR AND VACUUM VALVES

FOR LOW PRESSURE GRAVITY VACUUM SYSTEMS

In principle the same as the No. 1, except that an additional phosphor-bronze diaphragm at the bottom of the valve keeps the valve normally closed. A slight pressure deflects this diaphragm, opening the valve which then functions same as the No. 1, but closes absolutely when pressure drops, and prevents the return of air to the radiator through the valves. With the use of this valve a vacuum can be produced and vacuum system made of most any gravity steam job.

Price.....each **4.50**

No. 3 AIR LINE VALVES

For Paul systems, drip or air line service. Closes tightly against steam, but passes all air freely. Radiator connection, ⅛-inch and air line, ¼-inch.

Price.....each **2.50**

No. 4 JUNIOR QUICK VENT AIR VALVES

For quick service where water is not a factor. Designed to meet the demand for quick vent service at the end of the basement heating mains and the top of risers or on any indirect radiators, blast coils, etc. Closes tightly against steam but passes all air freely. Does not close against water. Threaded ¾-in.

Price.....each **2.80**

No. 5 QUICK VENT FLOAT AIR VALVES

For quick vent service where water is a factor. In principle the same as the No. 1. Threaded ⅜-inch.

Price.....each **8.00**

No. 6 QUICK VENT FLOAT AIR AND VACUUM VALVES

For vapor vacuum modulating and gravity vacuum systems. Closes against steam and water and return of air. Threaded ⅜-inch.

Price.....each **12.00**

NATIONAL RADIATOR AIR VALVES

AUTOMATIC

No. 1

Fig. 7888A

No. 2

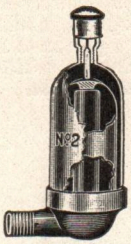


Fig. 7888B

No. 4

Fig. 7888C

No. 5

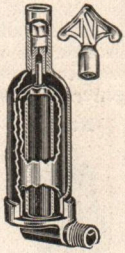


Fig. 7888D

No. 1 is a high grade valve for flat work. Has large float and shell and separate air passage and encased composition. No. 2 is a reliable low priced guaranteed valve. No. 4 is a double passage valve and particularly adapted for indirect radiation, coils, blower stacks, etc. No. 5 is fool-proof and cannot be tampered with. Has separate air passage and encased composition.

Price, No. 1, 1/8-inch	each	2.00
" " 2, 1/8 "	"	1.25
" " 4, 1/8 or 1/4-inch, Male or Female	"	2.00
" " 5, 1/8-inch	"	2.50

No. 8 VACUUM

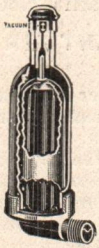


Fig. 7888E

No. 9 VACUUM

Fig. 7888F

NATIONAL PAUL

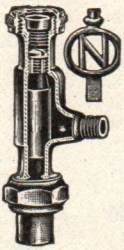


Fig. 7888G

NATIONAL "VENTO"

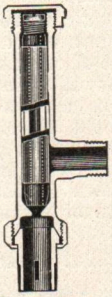


Fig. 7888H

IMPROVED THERMOSTATIC

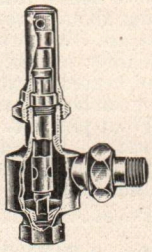


Fig. 7888J

No. 8 is similar to No. 5, except for vacuum feature. No. 9 has heavy base, large shell and float and lock shield. The composition is encased in brass encasement and cannot buckle. National Paul, for use on Paul systems, also as a drip valve. Has encased composition, spring cap, lead packed cap and special key feature. National "Vento" is for use in fan blast work, indirect and "Vento" radiation. National Thermostatic is used in connection with vacuum systems, heat coils, dry kilns, drips from risers and at the end of long runs of heating mains.

Price, No. 8 Vacuum	each	3.00
" " 9 "	"	5.00
" National Paul	"	3.50
" " "Vento"	"	10.00
" " Improved Thermostatic, 1/2x1/2-inch; Capacity, 250 sq. ft.	"	5.00
" " " " 3/4x1/2 " " 500 "	"	7.50
" " " " 1x1/2 " " 750 "	"	10.00

WATER GAUGE COLUMNS AND COMBINATIONS

COLUMN ONLY

Fig. 9756A

WATER GAUGE COLUMNS

No.	Length Inches	Center to Center Gauge Connection Inches	Ends Tapped Inches	Tapped for Gauge Cocks Inches	Tapped for Water Gauge Inches	Outside Diameter Inches	Price Column only Each
1	15	10	1	3/8	1/2	2 5/8	1.35
2	17	12	1	1/2	1/2	3	1.75
3	20	15	1 1/4	1/2	1/2	3 5/8	2.50
4	24	18	1 1/4	3/4	3/4	4	3.50
5	26	20	1 1/4	3/4	3/4	4 3/4	5.25
6	28	20 1/4	1 1/4	3/4	3/4	5 1/2	6.50

Nos. 2, 3 and 4 are standard sizes as usually called for. Nos. 1 and 6 are designed especially for house heating boilers and have no holes for gauge cocks. With Nos. 1, 5 and 6, the connection to boiler is made from top and bottom of column.

WITH TRIMMINGS

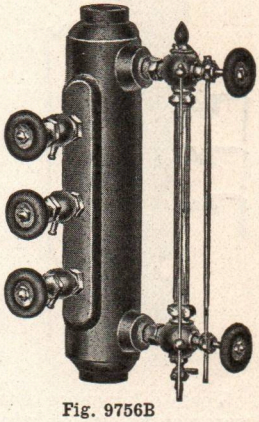


Fig. 9756B

COMBINATION GAUGES COMPLETE

For other combinations than given, add the price of trimmings as shown in the list below, or prices of any other trimmings, as may be preferred.

The prices given are suitable for pressures up to and including 175 pounds. For pressures up to 250 pounds, the same bodies may be used, but extra heavy gauge cocks and water gauges are recommended.

Number	1	2	3	4
Number of Gauge Cocks	2	3	3	3
Size, Iron Pipe Thread ... inches	3/8	1/2	1/2	3/4
Number of Water Gauges	1	1	1	1
Size of Steam Gauges ... inches	5	5	6	6
" " Nipple ... "	1/2	1/2	3/4	3/4
" " Globe Valve ... "	1/2	1/2	3/4	3/4
" " Syphon ... "	1/4	1/4	1/4	1/4
" " Bushings ... "	1/2x1/4	3/4x1/4 3/4x1/2	1x1/4 1x3/4	1 1/4x1/4 1 1/4x3/4
Price, Bodies only, Tapped and Painted ... each	2.75	4.00	6.00	8.00

When not otherwise specified, complete combination gauges will be trimmed and furnished as in above list.

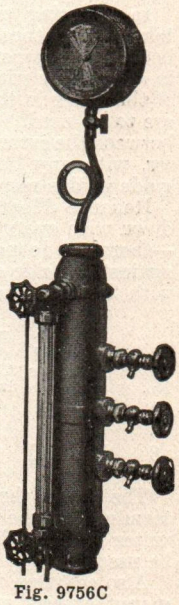


Fig. 9756C

RELIANCE SAFETY WATER COLUMNS

LOW WATER ALARMS

SECTIONAL

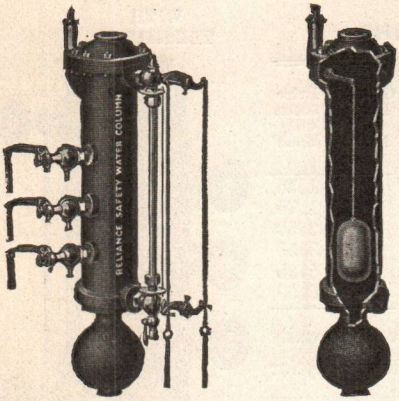


Fig. 7247A

These columns are of two kinds, the low water alarm, which whistles only when water line reaches the center of the lower gauge cock, and the combined high and low water alarm, which whistles when it reaches the center of either the lower or upper gauge cock.

In selecting columns, care should be taken to get those with proper distance between the upper and lower gauge cocks, in accordance with the natural variation of the water in the boilers on which they are to be used. Ordinarily, the distance between the extreme gauge cocks provided for, with any boiler, can be taken as a guide in this respect.

Reliance Floats do not slide up and down with every fluctuation of the water, —therefore do not wear themselves out against the side of column, as is the case with floats on the surface of the water.

No.	Adapted for Boiler Style	Gauge Cock Center Inches	Price, Each Column only	Price, Each Water Gauge and Gauge Cocks
2	36 to 54	3	25.00	7.00
6	54 " 72	4	28.00	10.00
8	Vertical	6	35.00	10.00

The size of the column in all cases is determined by the natural variation of the water in the boiler on which column is to be used.

Also columns for all the leading boiler manufacturers' special type boilers.

COMBINED HIGH AND LOW WATER ALARMS

SECTIONAL

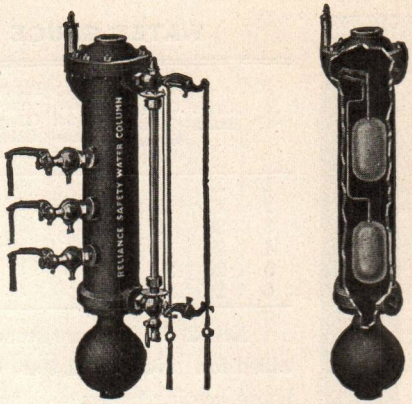


Fig. 7247B

The advantages resulting from the use of these appliances are many, and in the aggregate make them an exceptionally good investment. They render carelessness and negligence impossible without the consent of those in authority, causing the water to be carried steadily at the proper level, and cause the boilers to last much longer than they would otherwise.

They reduce the expense of keeping boilers in repair, lessen the waste of fuel, and obviate expensive stoppages, while protecting the boilers from too much, and life and property, generally, from too little, water. These savings are all continuous and constant, and easily aggregate more than the small cost of the columns every year.

These facts account for the general adoption of the Reliance Columns by the leading boiler manufacturers and the largest steam users.

No.	Adapted for Boiler Style	Gauge Cock Center Inches	Price, Each Column only	Price, Each Water Gauge and Gauge Cocks
1	36 to 54	3	28.00	7.00
5	54 " 72	4	30.00	10.00
7	Water Tube	6	35.00	10.00
9	Vertical	9	40.00	10.00
11	"	12	42.50	12.50

No mistake will be made ordinarily by selecting a column having the extreme gauge cocks the same distance apart as on the plain column furnished with boiler.

SELF-CLEANING WATER GAUGES

STEAM METAL

GAUGES WITH IRON WHEELS

ROUGH BODY TWO GUARDS

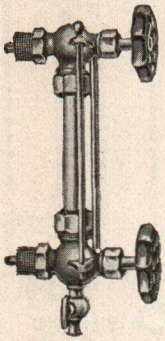


Fig. 23103A

POLISHED BODY TWO GUARDS

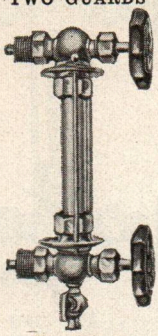


Fig. 23103B

No.	Style of Body	Size Glass Inches	No. of Guards	Pipe Thread Inches	Price Each
000	Bronzed	5/8x10	2	3/8	**2.75**
00	Polished	5/8x10	2	3/8	**3.25**
1	Bronzed	5/8x12	2	1/2	**3.00**
1½	"	3/4x16	2	3/4	**4.50**
2	Polished	5/8x12	2	1/2	**3.75**
4	"	5/8x12	4	1/2	**4.50**
6	"	3/4x16	4	3/4	**5.50**
6½	"	3/4x16	2	3/4	**4.75**

GAUGES WITH WOOD WHEELS

POLISHED BODY TWO GUARDS

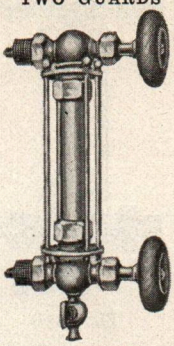


Fig. 23103D

POLISHED BODY FOUR GUARDS

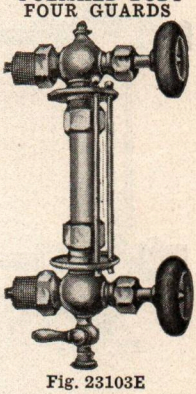


Fig. 23103E

No.	Style of Body	Size Glass Inches	No. of Guards	Pipe Thread Inches	Price Each
0	Polished	5/8x10	2	3/8	**3.75**
3	"	5/8x12	2	1/2	**4.25**
5	"	5/8x12	4	1/2	**5.00**
7	"	3/4x16	4	3/4	**6.25**
7½	"	3/4x16	2	3/4	**5.50**
*11	"	5/8x12	2	1/2	**10.00**
*12	"	5/8x12	4	1/2	**12.00**
*13	"	3/4x16	4	3/4	**13.00**
*14	"	3/4x16	4	3/4	**15.00**

EXPANSION TANK GAUGES

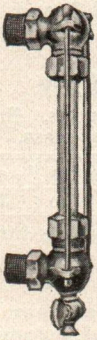


Fig. 23103C

No.	Style of Body	Size Glass Inches	No. of Guards	Pipe Thread Inches	Price Each
0000	Bronzed	5/8x12	2	1/2	**2.60**

*Nos. 9, 9½, 10, 11, 12, 13, and 14 have lever handle drip cocks, all others have T handle.

†Nos. 8 and 9 are provided with iron handles.

SQUARE BODY GAUGES

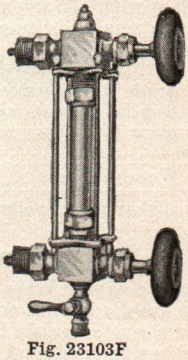


Fig. 23103F

No.	Style of Glass	Size Glass Inches	No. of Guards	Pipe Thread Inches	Price Each
†8	Polished	5/8x12	4	1/2	**5.25**
†8½	"	3/4x16	4	3/4	**7.25**
* 9	"	5/8x12	4	1/2	**6.00**
* 9½	"	3/4x16	4	3/4	**8.00**
*10	"	3/4x16	4	3/4	**10.00**

PENBERTHY WATER GAUGES

SAFEGUARD AUTOMATIC EXTERIOR — SAFEGUARD AUTOMATIC SECTIONAL — PENBERTHY SQUARE BODY REGULAR — PENBERTHY SQUARE BODY QUICK CLOSING

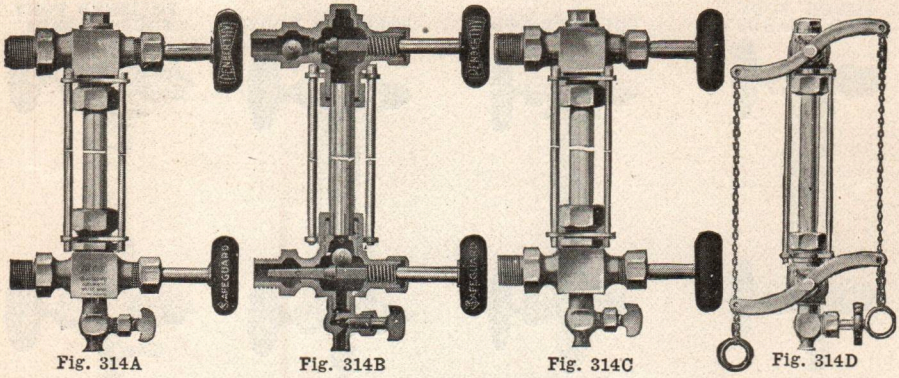


Fig. 314A — Fig. 314B — Fig. 314C — Fig. 314D

SAFEGUARD AUTOMATIC

A high grade bronze metal gauge tested to 300 pounds and operates on any pressure. Self-cleaning by the action of the blow-off vibrating balls. The cleaning stem in lower shank goes all the way through into the boiler, absolutely preventing opening from ever being closed by scale, etc. Equipped with special slow opening dripless pet cock. Balls cannot seat unless glass is broken, because the upper ball seat is designed to leak, which is necessary to the perfect operation of an automatic gauge, by preventing a false water level from being shown. Lugs are cast in the body to support ball in lower arm in case stem is removed. Has cap in top for replacing gauge glass.

Size, Shank	inches	⅜ and ½	¾
Price	each	5.00	6.50

Unless otherwise specified, a 12-inch glass is furnished with ⅜ and ½-inch sizes, and a 16-inch glass with ¾-inch size; longer glasses, excepting the 14-inch in the ⅜ and ½-inch sizes, at a small additional cost.

PENBERTHY REGULAR SQUARE BODY

A high grade inexpensive gauge for pressures up to 250 pounds. Protected by four rods. Fitted with dripless air cock, also cap in top for replacing glass.

Size, Shank	inches	⅜ and ½	¾
Price, with Wood Wheels	each	3.50	4.00

Specify distance between centers when ordering. Iron wheels furnished at same price when specified.

PENBERTHY QUICK CLOSING

Same as the square body described above, except that the stems are fitted with lever handles and are made with coarse threads, making the gauge quick closing. Both valves are operated simultaneously by a pull on the chain attached to the special ring device which equalizes the pull and closes both valves equally tight. Ring and enough chain to connect the levers. When ordering, state if additional chain is wanted and how many feet. A small extra charge will be made for same.

Size, Shank	inches	⅜ and ½	¾
Price, with Lever, Chain and Ring, Four Guards	each	5.00	6.50

All ⅜ and ½-inch gauges furnished with 12-inch glasses and ¾-inch with 16-inch, unless otherwise specified.

GAUGE COCKS

COMPRESSION

PLAIN

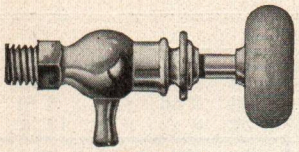


Fig. 4842A

The line of gauge cocks we offer is guaranteed first class in every respect.

Gauge cocks with blank shanks furnished at special price.

Size.....inches	¼	⅜	½	¾
Price.....each	.95	1.05	1.15	1.25

WITH STUFFING BOX

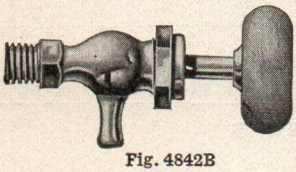


Fig. 4842B

Size.....inches	¼	⅜	½	¾
Price.....each	1.15	1.25	1.35	1.50

REGRINDING

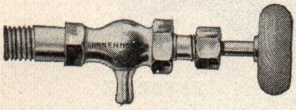


Fig. 4842C

Containing the excellent features of the regrinding valve.

Size.....inches	¼	⅜	½	¾
Price.....each	1.15	1.20	1.30	1.80

BALL

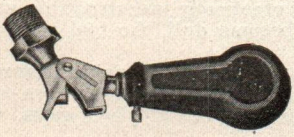


Fig. 4842D

Size.....inches	⅜	½	¾
Price.....each	1.30	1.35	1.50

EXCELSIOR

For Working Pressures up to 300 Pounds

PLAIN

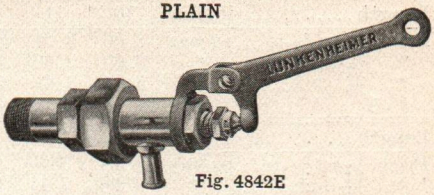


Fig. 4842E

To those who want their boiler plants equipped with only the high-grade devices, the Excelsior Gauge Cock shown above is recommended.

Some forms of gauge cocks are incapable of being repaired or cleaned, unless the boiler to which they are attached is out of commission. To overcome this objection, the Excelsior is provided with an auxiliary valve, which may be closed at any time and the main valve and trimmings removed for examination or repairs.

WITH EMERGENCY VALVE

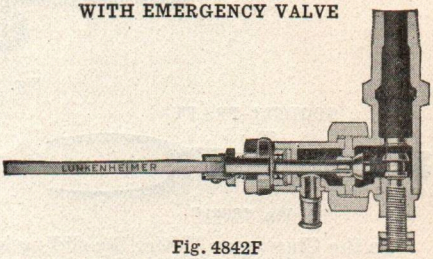


Fig. 4842F

Ordinarily, valve is screwed back to a joint against the plug, thus dispensing with a stuffing box. Plug is placed directly opposite the boiler connection to permit the insertion of a rod to clean out the passageway.

Size.....inches	½ or ¾
Price, Plain.....each	4.50
" Emergency Valve... "	6.00

SCOTCH GAUGE GLASSES, ETC.

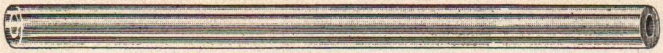


Fig. 18651A

Length..... inches	10	11	12	13	14	15	16	17	18
Price, ½ and ⅝-in...per dozen	3.00	3.24	3.60	3.84	4.20	4.44	4.80	5.04	5.40
" ¾-inch..... "	3.60	3.96	4.32	4.80	5.16	5.52	5.88	6.24	6.60
" ⅞ " ..... "	5.04	5.64	6.12	6.60	7.08	7.56	8.16	8.64	9.12
" 1 " ..... "	6.12	6.72	7.32	7.92	8.52	9.12	9.72	10.32	10.92
Length..... inches	19	20	22	24	30	36	48	60	72
Price, ½ and ⅝-in...per dozen	5.64	6.00	6.60	7.20	9.00	10.80	14.52	18.12	21.84
" ¾-inch..... "	7.08	7.44	8.16	8.88	11.16	13.44	18.00	22.56	27.12
" ⅞ " ..... "	9.60	10.20	11.16	12.12	15.24	18.24	24.36	30.48	36.48
" 1 " ..... "	11.52	12.12	13.44	14.64	18.24	21.96	29.16	36.48	43.80

60x1¼ inches, per dozen, 60.00.

RED REFLECTING GAUGE GLASSES

Length..... inches	10	11	12	13	14	15	16	17
Price, ⅝-inch.....per dozen	4.80	4.80	5.40	5.40	6.00	6.60	7.20	7.80
" ¾ " ..... "	6.00	6.60	6.60	6.60	7.20	7.20	7.80	8.40
Length.....inches	18	19	20	22	24	30	36	....
Price, ⅝-inch.....per dozen	8.40	9.00	9.60	10.80	12.00	22.00	28.00	....
" ¾ " ..... "	9.00	9.60	10.20	11.40	12.60	24.00	32.00	....

GAUGE GLASS CUTTERS

CHESTERTON

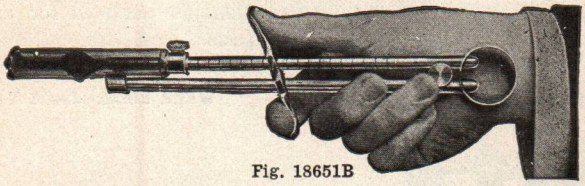


Fig. 18651B

GOODELL-PRATT

Fig. 18651C

FAVORITE

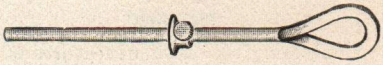


Fig. 18651D

In the Chesterton Cutter the sliding lever can be placed close to the work, and thus more power obtained than in any other cutter, and the steel cutting wheel can be used much longer than in any other cutter. A handy tool. No kit complete without it.

The Goodell-Pratt Cutter is provided with a graduated steel beam, and with a gauge stop that can be set at any desired point. The tool is practically indestructible, and by replacing the cutter wheels from time to time as they become dull, the tool always will be as good as new.

The trifling cost of a Favorite places it within the reach of every one who has use for such a tool. This simple little instrument will be found as effective as cutters costing many times its price. It will cut ¼ inch to 5 inches and will cut a ½-inch glass. Other makes will not.

Price, Chesterton.....	each	2.00
" Goodell-Pratt.....	"	1.50
" Favorite.....	"	.20

GAUGE GLASS WASHERS, ETC.

SQUARE WASHER

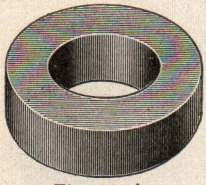


Fig. 727A

ROUND WASHER

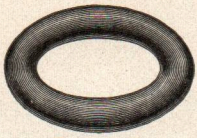


Fig. 727B

"GILBERT'S" PROTECTOR

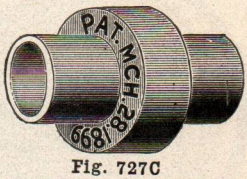


Fig. 727C

Size.....inches	½	⅝	¾	1
Price, Square, Half Round or Round.....per dozen	.25	.25	.35	.50
" " Extra Heavy..... "	.50	.50	.70	1.00
" Gilbert's Self-Packing Protectors.....per box	*.60	*.60	*.60	*.60

*Sizes ½, ⅝ and ¾-inches, packed one dozen in box. 1-inch size, ½ dozen in box.

FUSIBLE PLUGS

REGULAR LENGTH
No. 750 for Outside Insertion
No. 751 for Inside Insertion

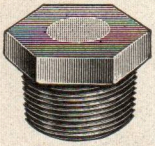


Fig. 727D

EXTRA LONG
No. 752 for Outside Insertion.

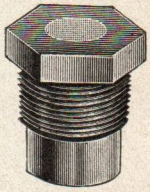


Fig. 727E

Size.....inches	½	¾	1	1¼	1½	2
Price, No. 750 or 751.....each	.60	.75	1.00	1.50	2.00	3.00
" " 752, Extra Long..... "	1.20	1.50	2.00	3.00	4.00	6.00

SHOWING APPLICATION
INSIDE OR PRESSURE SIDE

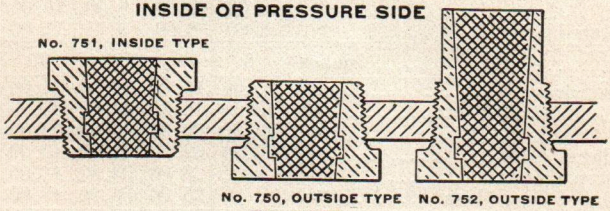


Fig. 727F

In ordering always give the style number. When not otherwise specified the No 750 "Outside Type" will always be furnished.

These plugs are filled with Banca tin, fulfilling in every respect the requirements of the Steamboat Inspection Service of the United States Government.

The No. 750 is made of regular length and constructed for outside insertion. The No. 751 is made regular length for inside insertion.

No. 752 is made extra long (having an extension 1 inch beyond the thread) and constructed for outside insertion only. We can furnish these to order, any length desired, at special prices according to quantity wanted.

The No. 752 complies with the Massachusetts State Law.

All plugs should be inserted so that the small end of the Banca tin shall be exposed to the fire.

ASHCROFT GAUGES

SINGLE SPRING
STEAM OR PRESSURE

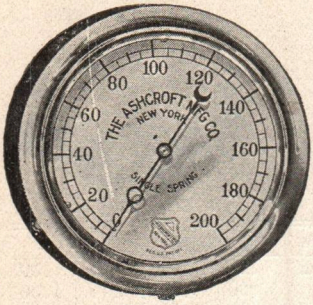


Fig. 2516A

AUXILIARY SPRING
STEAM OR PRESSURE

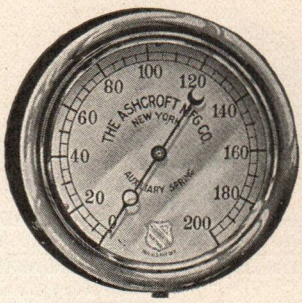


Fig. 2516B

DOUBLE SPRING
STEAM OR PRESSURE

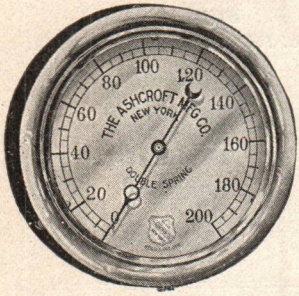


Fig. 2516C

VACUUM GAUGE

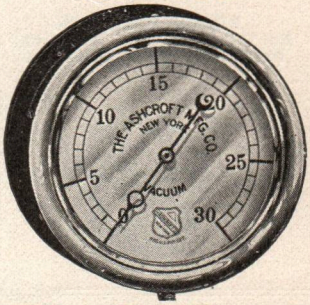


Fig. 2516D

SINGLE SPRING OR VACUUM

Size, Dial ..... inches	2½	3	3½	4½	5	5½
Price, Iron Case, Brass Ring ..... each	6.00	6.00	7.00	8.00	8.00	10.00
" " " N. P. " ..... "	6.15	6.15	7.18	8.20	8.20	10.25
" Brass " ..... "	8.00	8.00	9.00	10.00	11.00	12.00
" Nickel-plated Case ..... "	8.60	8.60	9.75	11.00	12.00	13.25

Size, Dial ..... inches	6	6¾	8½	10	12	.....
Price, Iron Case, Brass Ring ..... each	13.00	16.00	22.00	32.00	50.00	.....
" " " N. P. " ..... "	13.50	16.60	22.75	33.00	51.50	.....
" Brass " ..... "	16.00	20.00	30.00	40.00	75.00	.....
" Nickel-plated Case ..... "	17.50	22.00	32.50	43.00	79.00	.....
" *Brass, Deep Case ..... "	.....	23.00	33.50	44.00	80.00	.....
" *Nickel-plated Deep Case ..... "	.....	25.00	36.00	47.00	84.00	.....

AUXILIARY OR DOUBLE SPRING

Size, Dial ..... inches	4½	5	5½	6	6¾	8½	10	12
Price, Iron Case, Brass Ring ..... each	10.00	11.00	12.00	15.00	18.00	25.00	37.00	55.00
" " " N. P. " ..... "	10.20	11.20	12.25	15.50	18.60	25.75	38.00	56.50
" Brass " ..... "	12.00	13.00	14.00	18.00	22.00	34.00	45.00	80.00
" Nickel-plated Case ..... "	13.00	14.00	15.25	19.50	24.00	36.50	48.00	84.00
" *Brass, Deep Case ..... "	.....	.....	.....	.....	25.00	37.50	49.00	85.00
" *Nickel-plated Deep Case ..... "	.....	.....	.....	.....	27.00	40.00	52.00	89.00

*Furnished with O. G. or octagon ring.

All gauges should be graduated to double their working capacity if the greatest durability is desired.

ASHCROFT GAUGES

COMPOUND
PRESSURE AND VACUUM

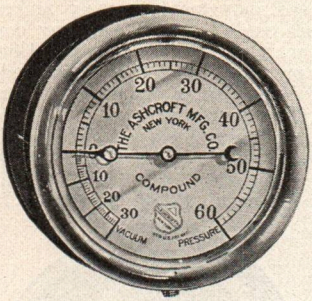


Fig. 6087A

COMBINATION
WATER PRESSURE

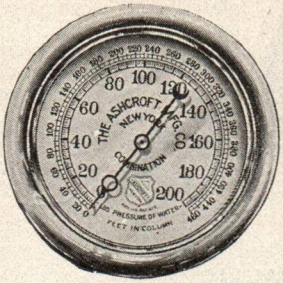


Fig. 6087B

ALTITUDE

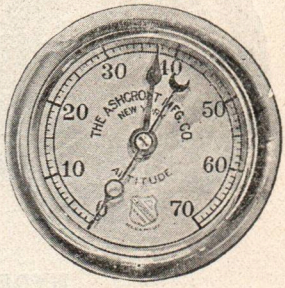


Fig. 6087C

Compound pressure and vacuum. Where the service is such that the indication of either pressure or vacuum may be required, this form of gauge should be selected. Will be graduated to any pressure from 20 to 500 pounds and to 30 inches of vacuum, or equivalent pounds if desired. Has ¼-inch male bottom connection.

Combination pressure and altitude. Specially designed to show the pressure due to a column of water and equivalent head in feet. The inner scale shows the pounds pressure per square inch, while the outer scale indicates the height of water above the gauge in feet. Has ¼-inch male bottom connection.

COMPOUND AND COMBINATION

Size of Dial.....inches	3½	4½	5	5½	6	6¾	8½	10	12
Price, Iron Case, Brass Ring...each	10.00	12.00	14.00	14.00	16.00	20.00	30.00	40.00	60.00
" " " N. P. " ... "	10.18	12.20	14.25	14.25	16.50	20.60	30.75	41.00	61.50
" Brass " ..... "	12.00	14.00	16.00	16.00	20.00	25.00	40.00	50.00	80.00
" Nickel-plated Case..... "	12.75	15.00	17.25	17.25	21.50	27.00	42.50	53.00	84.00
" *Brass, Deep Case..... "	.....	.....	.....	.....	.....	28.00	43.50	54.00	85.00
" *Nickel-plated Deep Case "	.....	.....	.....	.....	.....	30.00	46.00	57.00	89.00

ALTITUDE

This gauge is for the indication of the height of water in tanks, reservoirs, standpipes, heating systems or for similar service. The dial is graduated to show the head of water in feet. The gauge will be graduated to any altitude from 50 to 1150 feet. The black hand indicates the head of water in feet and the red index hand can be set by the user at any desired point on the dial. Has ¼-inch male bottom connection.

Size of Dial.....inches	4½	5	5½	6	6¾	8½	10	12
Price, Iron Case, Brass Ring.....each	12.00	12.00	14.00	16.00	20.00	30.00	40.00	60.00
" " " N. P. " ..... "	12.20	12.20	14.25	16.50	20.60	30.75	41.00	61.50
" Brass " ..... "	14.00	14.00	16.00	20.00	25.00	40.00	50.00	80.00
" Nickel-plated Case..... "	15.00	15.00	17.25	21.50	27.00	42.50	53.00	84.00
" *Brass, Deep Case..... "	.....	.....	.....	.....	28.00	43.50	54.00	85.00
" *Nickel-plated, Deep Case..... "	.....	.....	.....	.....	30.00	46.00	57.00	89.00

*Furnished with O. G. or octagon ring.

ASHCROFT GAUGES

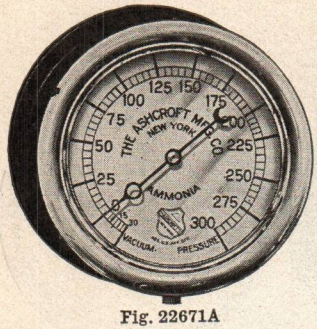


Fig. 22671A

AMMONIA

The interior mechanism consists of a single steel spring and standard geared movement, heavily nickel-plated. All other parts are made to withstand any corrosive action. Have ¼-inch male bottom connection. Will be graduated to any pressure from 100 to 500 pounds on the pressure scale and if specified, in inches of vacuum, or equivalent pounds, on the vacuum scale.

Size of Dial.....inches	4½	5	5½
Price, Iron Case, N. P. Ring...each	**25.50**	**30.50**	**30.50**
Size of Dial.....inches	6	6¾	8½
Price, Iron Case, N. P. Ring...each	**35.50**	**40.60**	**45.75**

HYDRAULIC

Supplied for all pressures from 1000 to 20000 pounds per square inch. Equivalent in tons on a given size ram will be graduated on the same dial if desired. The connection is ½-inch male bottom and gauge contains a check valve to eliminate shock due to sudden release of pressure.

Size of Dial....inches	4½	5	6	6¾	8½
Price, Iron Case, Brass Ring, each	**25.00**	**30.00**	**35.00**	**50.00**	**70.00**
" " " N. P. " "	**25.50**	**30.50**	**35.50**	**50.60**	**70.75**
" Brass " ..... "	**30.00**	**35.00**	**40.00**	**60.00**	**80.00**
" Nickel-plated Case .. "	**31.00**	**36.00**	**41.50**	**62.00**	**82.50**

For gauges with maximum hand, add 5.00 to list price.

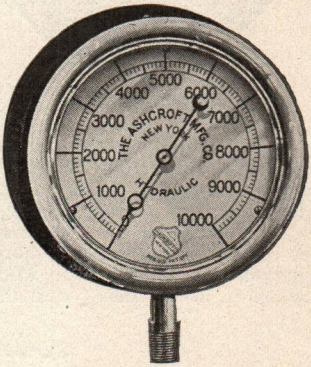


Fig. 22671B

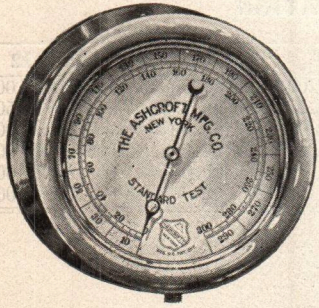


Fig. 22671C

STANDARD TEST

The interior mechanism consists of a single spring and a geared movement of special construction. Has ¼-inch male bottom connection. Will be graduated to any pressure from 20 to 500 pounds. Price includes small union cock.

Size of Dial.....inches	3	3½	4½	5½
Price, Brass, Shallow Case....each	**14.00**	**14.00**	**16.00**	**20.00**
" N.P. " " ....."	**14.60**	**14.75**	**17.00**	**21.25**
Size of Dial.....inches	6	6¾	8½	10
Price, Brass, Shallow Case....each	**25.00**	**30.00**	**40.00**	**50.00**
" N.P. " " ....."	**26.50**	**32.00**	**42.50**	**53.00**

INSPECTORS' TEST

For portable use in testing other gauges and where extreme accuracy is required. The interior mechanism consists of a single spring and geared movement of special construction. Has ¼-inch male bottom connection. Will be graduated to any pressure from 20 to 500 pounds. Price includes small union cock.

Price, 3-inch	Brass Case, without Cover.....each	**14.00**
" 3 "	Nickel-plated Case, without Cover "	**14.60**
" 3 "	Brass Case, with Cover ..... "	**15.00**
" 3 "	Nickel-plated Case, with Cover.. "	**15.60**

All gauges should be graduated to double their working capacity if the greatest durability is desired.

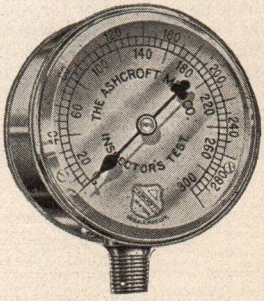


Fig. 22671D

ASHCROFT SIPHONS AND SIPHON COCKS

DOUBLE RADIATOR SIPHONS

TYPE RW

Fig. 5089A

TYPE RC

Fig. 5089B

TYPE RN

Fig. 5089C

Ashcroft Double Radiator Siphons are made of bronze, with large heat radiating properties. Radiation is further increased by leaving the entire siphon unfinished, and by the addition of horizontal radiating ribs.

Type		RW	RC	RN
Price, Brass	each	1.50	2.50	1.25
" Rough Nickeled	"	1.75	2.75	1.50

COIL PIPE SIPHONS

Fig. 5089D

The coil pipe siphon is recommended for general service in connection with steam gauges, except when it is necessary to drain itself entirely, or where vibration and other conditions prevail.

Size	inches	¼
Price, Iron	each	.25
" Brass Finished	"	1.00
" " Nickel-plated	"	1.50

STEAM GAUGE HAND JACKS

TYPE M

Fig. 5089E

TYPE G

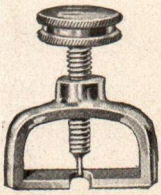


Fig. 5089F

For the removal of gauge hands without damage to the movements.

Type		M, for All Gauges up to 8½ In.	G, for All Larger Sizes
Price	each	1.50	3.00

AIR COCKS

TEE HANDLE

STRAIGHT NOSE

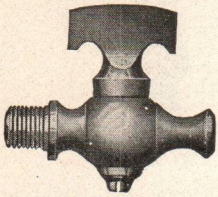


Fig. 787A

MALE BOTH ENDS

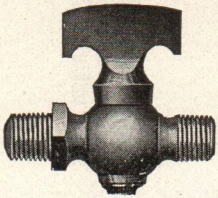


Fig. 787B

BIBB NOSE

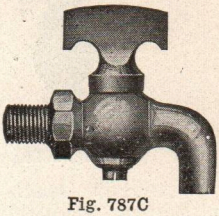


Fig. 787C

Straight Nose Size Inches	Price Each	Male Both Ends Size Inches	Price Each	Bibb Nose Size Inches	Price, Each Plain Nose	Price, Each Threaded Nose
1/8	.40	1/8	.55	1/8	.70	.80
1/4	.45	1/4	.65	1/4	.80	1.00
3/8	.50	3/8	.75	3/8	.90	1.10
1/2	.60	1/2	.90	1/2	1.00	1.35
3/4	.90	..	...	..	....	....
1	1.15	..	...	..	....	....

LEVER HANDLE

STRAIGHT NOSE

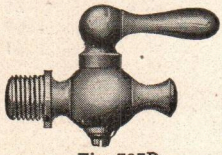


Fig. 787D

MALE BOTH ENDS

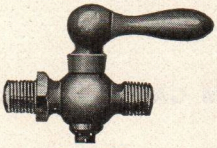


Fig. 787E

BIBB NOSE

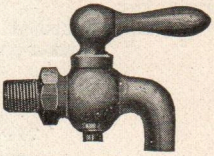


Fig. 787F

Straight Nose Size Inches	Price Each	Male Both Ends Size Inches	Price Each	Bibb Nose Size Inches	Price, Each Plain Nose	Price, Each Threaded Nose
1/8	.55	1/8	.70	1/8	.85	.95
1/4	.60	1/4	.80	1/4	.95	1.15
3/8	.65	3/8	.90	3/8	1.05	1.25
1/2	.75	1/2	1.05	1/2	1.15	1.50
3/4	1.05	..	....	..	....	....
1	1.30	..	....	..	....	....

AIR AND CYLINDER COCKS

AIR COCKS

T HANDLE

FEMALE BOTH ENDS

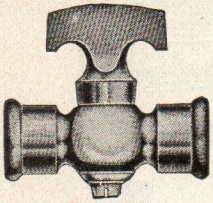


Fig. 621A

Size Inches	Price Each
1/8	.65
1/4	.70
3/8	.85
1/2	1.00

MALE AND FEMALE

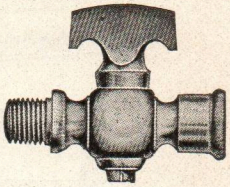


Fig. 621B

Size Inches	Price Each
1/8	.75
1/4	.80
3/8	.90
1/2	1.05

LEVER HANDLE

FEMALE BOTH ENDS

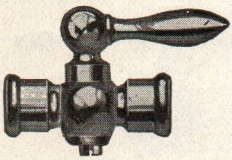


Fig. 621C

Size Inches	Price Each
1/8	.80
1/4	.85
3/8	1.00
1/2	1.15

MALE AND FEMALE

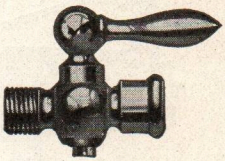


Fig. 621D

Size Inches	Price Each
1/8	.90
1/4	.95
3/8	1.05
1/2	1.20

CYLINDER COCKS

WITH UNION

T HANDLE

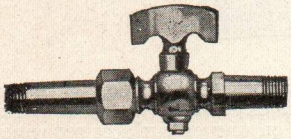


Fig. 621E

Size Inches	Price Each
1/8	1.35
1/4	1.60
3/8	1.85
1/2	2.35
3/4	2.60
1	3.10

LEVER HANDLE

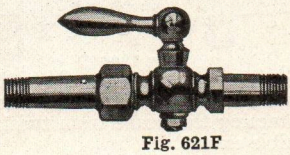


Fig. 621F

Size Inches	Price Each
1/8	1.50
1/4	1.75
3/8	2.00
1/2	2.50
3/4	2.75
1	3.25

TRACTION ENGINE

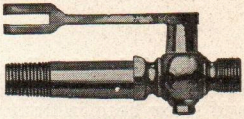


Fig. 621G

I.P. Size Inches	Blank Shank Inches	Price, Each Short Shank	Price, Each Long Shank
1/8	3/8	1.15	1.45
1/4	1/2	1.30	1.55
3/8	5/8	1.40	1.70
1/2	3/4	1.85	2.20
1/2	7/8	2.50	3.00
3/4	1 1/8	3.25	4.00

ELLISON DRAFT GAUGES

200 Gauges in Eighteen Types—The Standard Everywhere

DIFFERENTIAL DRAFT GAUGE—OPEN TYPE
Model 1916

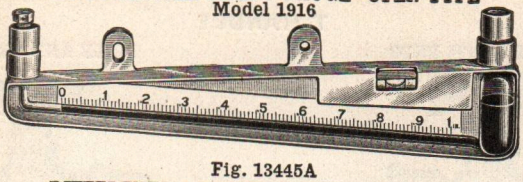


Fig. 13445A

DIFFERENTIAL DRAFT GAUGE—COVER TYPE
Model 1916, Patented

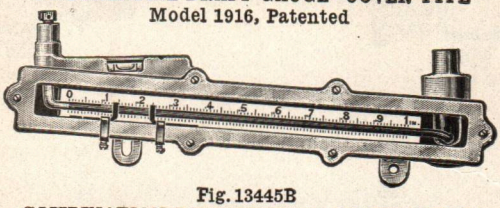


Fig. 13445B

COMBINATION DIFFERENTIAL DRAFT GAUGE
Model 1916, Patented

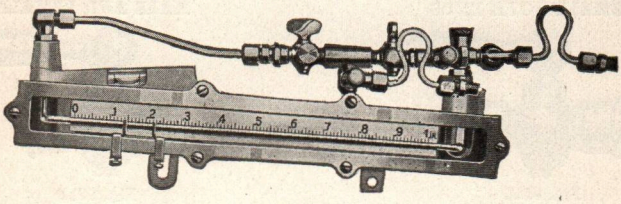


Fig. 13445C

COMPOUND DIFFERENT DRAFT GAUGES
Model 1916, Patented

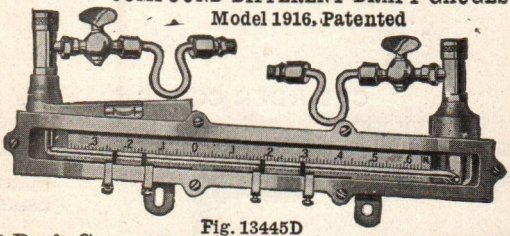


Fig. 13445D

All Model 1916 Draft Gauges are self lining, the right ear being set in and cupped on the back side, riding free on a shouldered riding-pin, the ear clearing the board in back and screw head in front, protecting the frame from twisting on uneven surfaces reducing glass breakage to lowest possible extent.

The draft gauge casings, unless otherwise specified, are of aluminum, of heavy construction, polished and buffed, nipples tapped ⅛ inch straight, for draft gauge connection and nipple reducer.

The scales are of white metal in black graduations. For metallurgical and chemical industries, lacquered with Bakelite at small additional cost. Compound scales have readings on both sides of zero, designated in tables minus and plus.

The levels are long and very sensitive, made special for Ellison Differential Draft Gauges, of high pressure glass, chemically etched instead of cut.

Pamphlet of complete line on request.

WHISTLES AND WHISTLE VALVES

WITHOUT VALVE

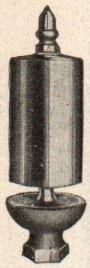


Fig. 10395A

WITH VALVE

Fig. 10395B

Diam. of Bell Inches	Size Pipe Connections Inches	Price, Each Without Valve	Price, Each With Valve
1	3/8	2.20	3.10
1¼	3/8	2.75	3.75
1½	½	3.00	4.00
2	¾	4.35	5.50
2½	¾	5.25	7.40
3	1	7.25	8.50
3½	1	9.50	13.00
4	1¼	12.00	16.50
5	1½	21.00	27.50
6	2	31.00	37.50
8	2½	70.00	95.00
10	2½	150.00	210.00

CHIME

WITHOUT VALVE

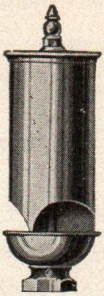


Fig. 10395D

WITH VALVE

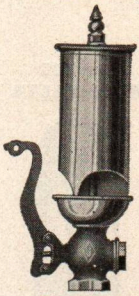


Fig. 10395E

Diam. of Bell Inches	Size of Connection Inches	Price Each Without Valve	Price Each With Valve
1½	3/8	4.50	7.50
2	½	5.00	8.00
3	¾	9.50	14.00
4	1	15.00	20.00
5	1¼	28.00	35.00
6	1½	42.00	50.00
8	2	95.00	110.00
10	2½	190.00	210.00

WHISTLE VALVES

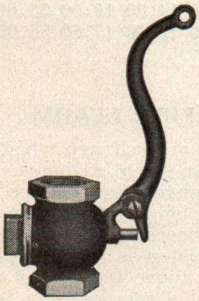


Fig. 10395C

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
3/8	2.00	1	4.40	2	14.00
½	2.50	1¼	5.60	2½	18.00
¾	3.00	1½	7.40	3	29.50

THREE BELL CHIME WHISTLES

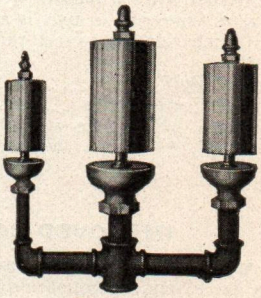


Fig. 10395F

No. 1

Composed of one, each, 1½, 2 and 2½-inch whistles. Steam pipe, 1 inch.

Price.....each **22.00**

No. 2

Composed of one, each, 3, 4 and 5-inch whistles. Steam pipe, 1½ inch.

Price.....each **40.00**

LUNKENHEIMER STEAM WHISTLES

Patented

ALL BRONZE, OR IRON BASE BRONZE BELL

MOCKING BIRD

No. 445
WITH VALVE

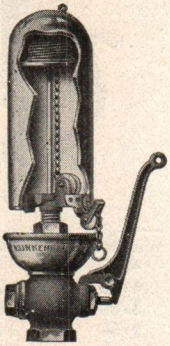


Fig. 6557A

No. 377
WITHOUT VALVE

Fig. 6557B

No. 446
IMPROVED COMBINATION
OR FIRE ALARM WHISTLE
COMPLETE, WITH VALVE

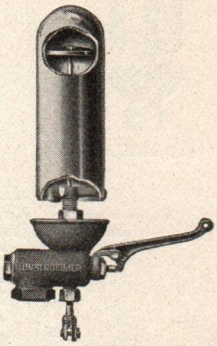


Fig. 6557C

MOCKING BIRD

This is a simple and practical variable sound whistle, especially adapted to traction engines, steamboats, factory and mill use.

It makes an excellent fire alarm and is attached like any ordinary whistle. The bell is provided with a piston, which is pulled downward by a chain running between pulleys, and when not in use, is always at the top, being drawn upwards by means of a spring. To change the sound, pull the chain.

Diameter of Bell.....inches	2½	3	3½	4	5	6
Size of Pipe Connections..... "	¾	¾	1	1¼	1½	1½
Price, No. 445, All Bronze, with Valve ...each	**10.50**	**14.00**	**20.00**	**28.00**	**40.00**	**56.00**
" " 377, " " without Valve "	**9.00**	**12.00**	**17.50**	**25.00**	**37.00**	**50.00**

IMPROVED COMBINATION OR FIRE ALARM

This whistle is designed to answer the purpose of an ordinary whistle as well as that of a fire alarm. Thousands are in use for fire alarm signal purposes in towns and villages throughout the world. It is provided with a piston that can be moved up or down within the bell or tube, thus changing the interior length of same, and consequently, the sound of the whistle. When the piston is not operated the whistle gives but a single note, like any ordinary whistle, but when the piston is moved up and down, a howling, penetrating noise is produced. When placed above the roof of a building, an extension rod should be coupled to the piston stem and a rope or wire to the whistle valve lever.

Diameter of Bell .....inches	2½	3½	5	8
Size of Pipe Connections..... "	¾	1	1½	2
Price, No. 446, Iron Base, with Valve.....each	.....	**31.00**	**40.00**	**100.00**
" " 163, Bronze " " " ..... "	**24.00**	**40.00**	**53.00**	**120.00**
" " 89, Iron " without Valve ..... "	.....	**28.00**	**37.00**	**95.00**

TRIP GONGS, ETC.

No. 50
POLISHED BELL METAL

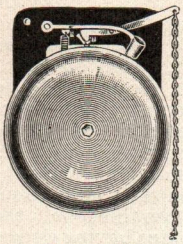


Fig. 9149A

No. 100 INSIDE STRIKING
SHOWING MECHANISM

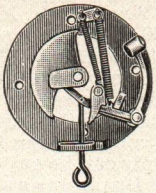


Fig. 9149B

No. 60 STANDARD
LOCOMOTIVE SIGNAL

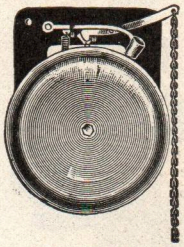


Fig. 9149C

No. 50

Diameter.....inches	3	4	5	6	7	8	9
Price.....per dozen	**10.00**	**12.50**	**16.50**	**24.00**	**34.00**	**46.00**	**70.00**
Diameter.....inches	10	12	14	16	18	20	24
Price.....per dozen	**84.00**	**150.00**	**212.00**	**260.00**	**310.00**	**480.00**	**1176.00**

No. 100

The attachment is entirely within the gong shell. This feature adds to the appearance of the gong; permits of the saving of space in the use, as well as in the handling of it; affords protection to the mechanism; permits the gong being placed to pull from any direction without having the appearance of being misplaced.

Diameter.....inches	6	8	10	12	14
Price, Grade A.....per dozen	**18.00**	**36.00**	**60.00**	**96.00**	**144.00**
" " B..... "	**24.00**	**46.00**	**84.00**	**150.00**	**212.00**
" " C..... "	**31.50**	**61.00**	**108.00**	**186.00**	**278.00**

Grade A — attachment iron, gong, nickel-plated steel. Grade B — attachment iron, gong, polished bell metal. Grade C — attachment brass, gong, polished bell metal.

No. 60

Diameter.....inches	3	4	5	6	7	8
Price.....each	**.80**	**.90**	**1.00**	**1.50**	**2.00**	**3.00**
Diameter.....inches	9	10	12	14	16	18
Price.....each	**4.00**	**5.00**	**8.00**	**12.00**	**16.00**	**18.00**

GONG PULLS

No. 8 LIGHT

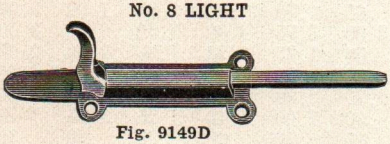


Fig. 9149D

No. 9 HEAVY AND MEDIUM

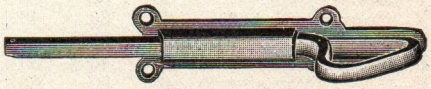


Fig. 9149E

Style	Size Inches	Price, per Dozen Plain	Price, per Dozen Polished
Light	2¼	**5.00**	**6.00**
Medium	2¾	**6.00**	**9.00**
Heavy	3½	**14.00**	**17.00**
Extra Heavy	4½	**24.00**	**28.00**

PENBERTHY AUTOMATIC INJECTORS

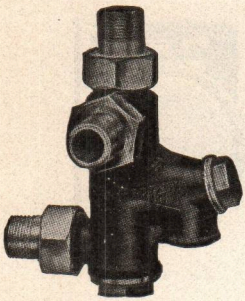
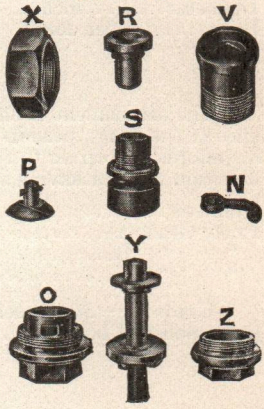


Fig. 7280A

A high grade automatic machine; meaning, if the current of water is broken by any cause, the injector will pick up the water and re-establish the current to the boiler without the least attention. Every machine is carefully tested, and will work on the following points: Start low, 20 to 22 lbs. steam on 3-foot lift. Work high, 165 to 170 lbs. steam on 3-foot lift. Lift water, 20 to 24 feet on 60 to 80 lbs. steam. Will deliver water to boiler at 160 to 212 degrees, according to temperature of feed water and steam pressure. Water 200 to 212 degrees can always be delivered at nearly all pressures over 50 lbs. by throttling suction valve and delivering minimum capacity. It is advisable in many cases to install an injector large enough so that the supply can be cut down and attain this result, thereby saving fuel. By placing a short piece of pipe having a stopcock, in the overflow, and closing after the injector has started, water 8 to 10 degrees hotter can be handled, but the injector is rendered non-automatic while the stopcock is closed.

Size	Price Each	H. P. Based on Ordinary Tubular Boiler	H. P. Based on 30 Lbs. Water per H. P. per Hour	Pipe Connections Inches	Gallons per Hour 1 to 3-ft. Lift, 60 to 110 Lbs. Steam Pressure	
					Max.	Min.
O	15.00	3 to 6	4 to 8	1/4	60	35
OO	16.00	4 " 8	6 " 12	3/8	80	45
A	18.00	8 " 16	10 " 20	1/2	135	70
AA	20.00	12 " 22	15 " 30	1/2	180	100
B	25.00	17 " 32	22 " 45	3/4	260	140
BB	30.00	20 " 45	25 " 60	3/4	360	180
C	40.00	40 " 65	45 " 80	1	475	250
CC	45.00	45 " 80	50 " 100	1	600	325
D	55.00	50 " 100	60 " 135	1 1/4	800	425
DD	60.00	75 " 135	85 " 165	1 1/4	1000	525
E	75.00	100 " 180	125 " 235	1 1/2	1400	740
EE	90.00	115 " 255	150 " 320	1 1/2	1900	850
F	110.00	160 " 320	200 " 400	2	2400	1275
FF	125.00	200 " 400	250 " 500	2	3000	1600
G	150.00	300 " 500	325 " 600	2 1/2	3600	1875
GG	200.00	375 " 600	400 " 750	2 1/2	4200	2150

REPAIR PARTS



REPAIR PARTS

Size of Injector....	O OO	A AA	B BB	C CC	D DD	E	EE	F	FF	G GG
R—Steam Jet...each	.25	.35	.45	.55	.65	.75	.75	.85	1.00	2.00
S—Suction Jet.. "	.25	.35	.45	.55	.65	.75	.75	.85	1.00	3.00
Y—Delivery Jet. "	1.25	1.50	2.00	2.50	3.00	3.75	4.50	5.50	6.50	9.00
X—Coupling Nut "	.25	.30	.40	.50	.60	1.25	1.25	1.50	1.50	2.00
V—Tail Pipe.... "	.25	.30	.40	.50	.60	.80	.80	1.00	1.00	1.25
Z—Overflow Cap "	.30	.40	.50	.60	.70	.80	.80	.90	.90	1.50
P— " Valve "	.40	.50	.60	.75	.90	1.00	1.10	1.25	1.25	1.75
N— " Hinge "	.10	.10	.15	.15	.15	.20	.20	.20	.20	.30
O—Plug..... "	.60	.80	1.00	1.25	1.50	1.75	1.75	2.00	2.00	4.00
Strainer..... "	.40	.45	.50	.55	.60	.75	.75	1.00	1.00	1.50

In ordering parts do not fail to give serial letter and number, which will be found on top of overflow. In referring to or ordering parts, designate them by letter or name as per above.

PENBERTHY INJECTORS

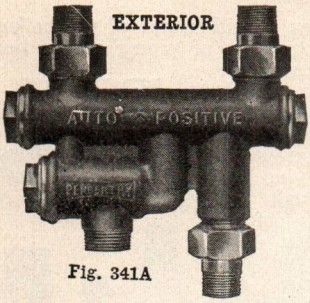
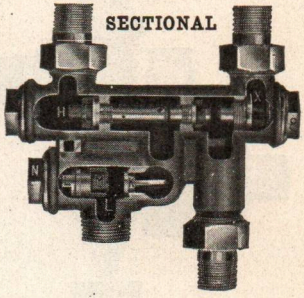


Fig. 341A

"AUTO-POSITIVE"

To meet the demand for an injector operating between 150 and 200 lbs. pressure, handling water that has become heated by the use of a syphon, and consequently too hot for injectors of the usual automatic type. It is constructed on new principles, having but five working parts, and combining the features of a positive and automatic injector.



Will start on a short lift at 20 to 25 lbs. pressure and operate to 200 lbs. pressure, water 74° Fahr. At winter temperature, works to 240 lbs. pressure. Will lift 3 feet at 200 lbs. pressure to 20 to 23 feet at 65 to 120 lbs. Will handle hot water at 130° to 135° at 75 to 100 lbs., 125° to 130° at 50 to 120 lbs., 110° to 115° at 35 to 150 lbs., 90° to 95° at 28 to 175 lbs., under 60° at 30 to 225 lbs., and under 40° at 35 to 240 lbs.

By placing a cock in overflow, water 6° to 8° hotter can be handled. This renders the injector non-automatic while stopcock is closed.

REPAIR PARTS

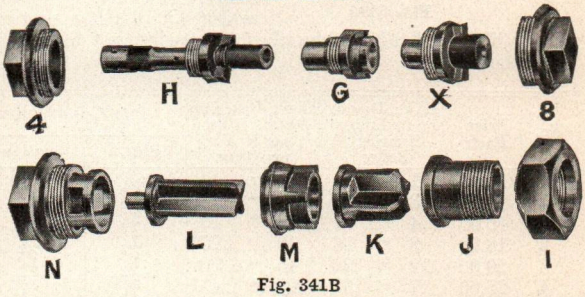


Fig. 341B

No.	Price Each	H. P. Allowing 7½ to 8 Gals. per H. P. per Hour	Pipe Connections Inches			Cap. per Hr., 75 to 125 Lbs. Steam 3-Ft. Lift, Gals.		No.	Price Each	H. P. Allowing 7½ to 8 Gals. per H. P. per Hour	Pipe Connections Inches			Cap. per Hr., 75 to 125 Lbs. Steam 3-Ft. Lift, Gals.	
			Steam	Suction	Delivery	Max.	Min.				Steam	Suction	Delivery	Max.	Min.
112	18.00	5 to 15	⅜	⅜	⅜	120	40	119	60.00	47 to 145	1¼	1¼	1¼	1125	375
113	20.00	7 " 25	½	½	½	200	60	121	90.00	87 " 265	1½	1½	1½	2000	700
115	30.00	16 " 50	¾	¾	¾	400	130	123	125.00	125 " 400	2	2	2	3000	1000
117	45.00	28 " 85	1	1	1	675	225	125	200.00	200 " 600	2½	2½	2½	4200	1500

REPAIR PARTS

Size of Injector		112	113	115	117	119	121	123	125
8—Steam Plug	each	.70	.80	.80	.90	1.10	1.40	1.70	2.50
X— " Jet	"	.40	.50	.60	.75	.90	1.00	1.20	2.00
G—Suction Jet	"	.30	.40	.50	.60	.75	.85	1.00	1.50
H—Delivery "	"	.90	1.00	1.50	2.00	3.00	4.00	5.50	8.00
4— " Plug	"	.60	.70	.80	.90	1.10	1.40	1.70	2.50
N—Overflow "	"	.75	.80	1.00	1.25	1.50	1.75	2.00	3.00
L—Pressure Valve	"	.25	.30	.45	.60	.75	1.00	1.25	2.00
M— " " Collar	"	.30	.40	.60	.90	1.25	1.75	2.25	3.00
K—Vacuum "	"	.25	.30	.45	.60	.75	1.00	1.25	1.75
I—Coupling Nut	"	.25	.30	.40	.50	.60	1.25	1.50	2.00
J—Tail Pipe	"	.25	.30	.40	.50	.60	.80	1.00	1.25
Strainer	"	.40	.45	.50	.55	.60	.75	1.00	1.50
Tool for Removing Jet	"	.45	.50	.60	.70	.80	.90	1.00	1.50

In ordering parts give size number; also, if possible, shop number of injector.

U. S. AUTOMATIC INJECTORS

REGULAR STYLE

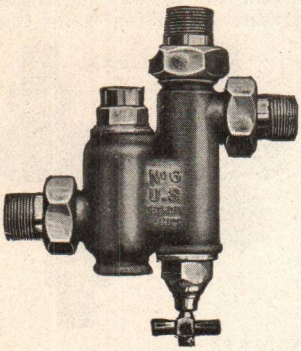


Fig. 649A

The regular style goes on either side of the boiler Special styles to fit any condition of piping can be furnished. A distinctive feature is the drip cock (see illustration) which has the following special advantages:

It drains the injector when not in use and thus prevents freezing.

By leaving it open you can start injector even though the check valve leaks. This is impossible without a drip cock. By opening the drip cock you can start up with lower steam. By leaving it open, when not in use, it prevents the suction pipe from getting hot or the jet from lining up when the steam or check valve leaks. It enables you to take hot water out of a hot suction pipe on a long lift. It is always handy for drawing hot water for any purpose when the injector is working.

REPAIR PARTS

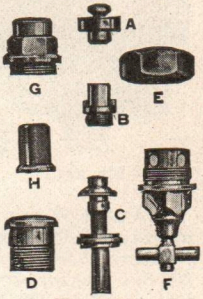


Fig. 649B

No.	Price Each	H. P., Based on Ordinary Tubular Boiler	H. P., Based on 30 Lbs. Water per H. P. per Hour	Pipe Connections, Inches			Capacity Gallons per Hour	
				Steam	Suction	Discharge	Maximum	Minimum
00	13.00	1 to 3	1 to 4	¼	¼	¼	36	20
0	14.00	3 " 6	4 " 8	⅜	⅜	⅜	65	35
1	16.00	4 " 8	6 " 12	⅜	⅜	⅜	90	55
2	18.00	8 " 16	10 " 20	½	½	½	135	65
3	20.00	12 " 22	15 " 30	½	½	½	180	100
4	25.00	17 " 32	22 " 45	¾	¾	¾	260	140
5	30.00	20 " 45	25 " 60	¾	¾	¾	355	170
6	40.00	40 " 65	45 " 80	1	1	1	475	300
7	45.00	45 " 80	50 " 100	1	1	1	600	350
8	55.00	50 " 100	60 " 135	1¼	1¼	1¼	800	425
9	60.00	75 " 135	85 " 165	1¼	1¼	1¼	1000	525
10	75.00	100 " 180	125 " 235	1½	1½	1½	1400	800
11	90.00	115 " 255	150 " 320	1½	1½	1½	1900	950
12	110.00	160 " 320	200 " 380	2	2	2	2400	1300
13	125.00	200 " 400	250 " 500	2	2	2	3000	1600
14	150.00	300 " 500	325 " 550	2	2	2	3600	2000
15	175.00	350 " 550	400 " 600	2½	2½	2½	4000	2200
16	200.00	400 " 600	500 " 750	2½	2½	2½	4500	2500
17	300.00	600 " 900	750 " 1000	3	3	3	5800	3000

REPAIR PARTS

Size of Injector.....No.	00 to 3	4 and 5	6 and 7	8 and 9	10 and 11	12 to 14
D—Tail Pipe.....each	.30	.35	.40	.50	.75	1.00
E— " " Nut..... "	.30	.40	.50	.65	.85	1.20
A—Steam Jet ..... "	.80	1.00	1.15	1.35	1.60	2.00
B—Suction Jet..... "	.50	.75	1.25	1.50	1.75	2.00
C—Delivery Tube..... "	1.00	1.10	1.45	1.75	2.00	2.50
F— " Cap..... "	1.00	1.10	1.45	1.75	2.00	2.50
G, H } Overflow Cap and Valve "	.80	.95	1.00	1.25	1.50	2.00

In ordering U. S. Injector Parts, always give size and shop number, and specify the parts by the names given above: use no other terms.

PENBERTHY XL-96 IMPROVED EJECTORS

Lifts 22 to 25 Feet. Elevates 25 to 100 Feet, 30 to 100 Pounds Pressure.

Fig. 4817A

REPAIR PARTS

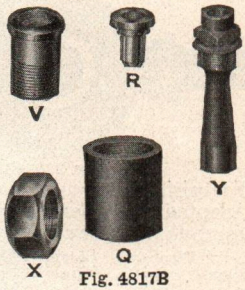


Fig. 4817B

The lifting and elevating power is so combined in the XL-96 Ejector as to make it unquestionably the best device of its kind. The principle and power contained in so small, handy and economical an instrument, continually suggests new uses, which often demand that the tubes of the ejector be proportioned particularly for the service. We have perfected and can furnish special ejectors singularly efficient in the work for which they are designed.

No.	Steam Connection Inches	Suction and Discharge Inches	Capacity, Gallons per Hour — 3-Foot Lift — Steam Pressure, Pounds — 40 to 65	3-Foot Lift — 20 to 40 or 65 to 100	50-Foot Elevation	25-Foot Elevation	Vertical Lift Feet — 40 to 75	25 to 40 or 75 to 100	Price, Each — Brass	Iron Body Brass Jets
1	3/8	1/2	240	235	120	180	23	20	**8.00**	.....
2	1/2	3/4	500	450	250	375	25	22	**10.00**	.....
3	3/4	1	840	700	420	625	25	22	**15.00**	.....
4	1	1 1/4	1350	1300	650	950	25	22	**20.00**	.....
5	1	1 1/2	1950	1850	975	1450	25	22	**25.00**	**20.00**
6	1 1/4	2	3500	3000	1750	2600	25	22	**35.00**	**27.50**
*7	1 1/2	2 1/2	5700	4350	2500	3750	25	22	**50.00**	**40.00**
*8	2	3	9500	8160	4750	7200	25	22	**70.00**	**50.00**
*9	2	3 1/2	13600	12400	6800	10200	25	22	**105.00**	**70.00**
*10	2 1/2	4	18400	17100	9200	13800	25	22	**145.00**	**95.00**

Sizes 5 and 6 will be sent in all brass, unless ordered with iron body and brass jets and steam connection.

*Unless ordered in brass, sizes 7 to 10 inclusive, will be shipped with iron body, brass jets and steam connection.

TABLE SHOWING SIZE OF BOILERS REQUIRED FOR EJECTORS

Number of Ejector	1, 2, 3	4, 5, 6	7, 8	9, 10
Size of Boiler.....horse power	2 to 6	8 to 12	15 to 20	25 to 30

REPAIR PARTS

Size Number	1	2	3	4	5	6	7	8	9	10
R—Jet .....each	.25	.35	.45	.55	.60	.80	1.00	1.25	1.50	2.00
Y—Delivery Jet..... "	.80	1.00	1.25	1.50	1.75	2.50	4.00	6.00	8.00	10.00
V—Tail Pipe Brass..... "	.25	.30	.40	.50	.50	.60	.80	1.00	1.00	1.25
X—Coupling Nut Brass. "	.25	.30	.40	.50	.50	.60	1.25	1.50	1.50	2.00
Strainer..... "	.45	.50	.55	.60	.75	1.00	1.50	....	....	....
Q—Regular I. P. Coupling..... "	...	...	...	...	...	....	....	....	....	....

SPECIAL ACID RESISTING EJECTORS

While the composition used in the regular stock XL-96 Ejector is very efficient against the milder solutions containing acids, this ejector is made of special anti-acid compositions, which will resist the action of acids as far as it is possible for metal to resist it. Prices upon application.

JET PUMPS, SUCTION TEES, ETC.

JET PUMPS

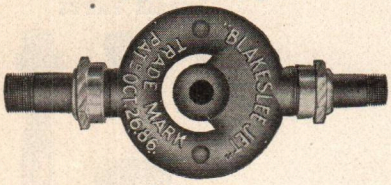


Fig. 23529A

For raising water and other liquids.

Adapted for tanneries, breweries, creameries, and railroad water stations.

Size Suction Inches	Discharge Pipe Inches	Steam Pipe Inches	Gallons per Minute	Price Each
¾	½	⅜	8	**8.00**
1	¾	½	15	**10.00**
1¼	1	½	20	**12.00**
1½	1¼	¾	30	**14.00**
2	1½	¾	40	**16.00**
2½	2	1	50	**20.00**
3	2½	1	60	**24.00**

REPAIR PARTS FOR JET PUMPS

Size Inches	Price, Each: Iron Nuts	Brass Nuts	Iron Nipples
½	....	**.50**	**.25**
¾	....	**.50**	**.25**
1	....	**.50**	**.25**
1¼	**.50**	**.75**	**.35**
1½	**.50**	**.75**	**.35**
2	**.60**	**1.00**	**.60**
2½	**.80**	**1.50**	**.75**
3	**.90**	**1.50**	**1.00**

Size Inches	Price, Each: Iron Bodies	Combining Tubes	Steam Tubes
¾	**1.50**	**.75**	**.25**
1	**2.00**	**.75**	**.50**
1¼	**2.20**	**.75**	**.50**
1½	**2.50**	**1.00**	**.60**
2	**2.80**	**1.00**	**.60**
2½	**3.00**	**1.50**	**.75**
3	**3.50**	**1.50**	**.75**

STRAINERS

FOR INJECTORS AND EJECTORS PIPE OR HOSE CONNECTION

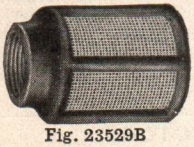


Fig. 23529B

Size....inches	½	¾	1	1¼
Price....each	**.40**	**.50**	**.60**	**.75**
Size....inches	1½	2	2½	3
Price....each	**1.00**	**1.50**	**2.00**	**2.50**

SUCTION TEES

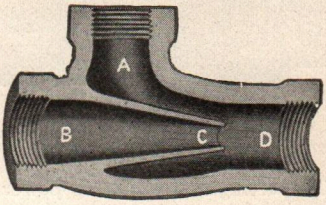


Fig. 23529C

STANDARD, 100 POUNDS PRESSURE

Size....inches	½	¾	1	1¼
Price.....each	**.80**	**.80**	**1.00**	**1.25**
Size....inches	1½	2	2½	3
Price....each	**1.50**	**2.00**	**3.00**	**4.50**

EXTRA HEAVY, 250 POUNDS PRESSURE

Size...inches	1	1¼	1½	2
Price...each	**2.00**	**2.50**	**3.00**	**4.00**
Size...inches	2½	3	3½	4
Price...each	**6.00**	**9.00**	**12.00**	**15.00**
Size...inches	5	6	..	..
Price...each	**24.00**	**34.00**	.....	.....

NOISELESS STEAM WATER HEATERS

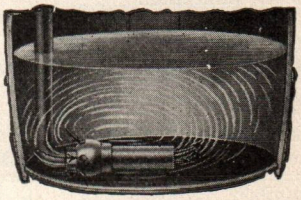


Fig. 23529D

Number.....	F	G	H	J
*Capacity....gal.	50	60	75	100
Price .....each	**1.50**	**1.75**	**2.00**	**2.50**
Number.....	K	L	M	N
*Capacity....gal.	125	175	250	500
Price.....each	**3.00**	**4.00**	**5.00**	**8.00**

* Gallons of water heated 70 to 210 degrees in 30 minutes with 70 pounds steam pressure.

NEWMAN PORTABLE WATCHMAN'S CLOCKS

APPROVED BY NATIONAL BOARD OF FIRE UNDERWRITERS AND ALL MUTUALS

CLOCK OPEN IN GRILLE POUCH

Fig. 12580A

A desirable feature of this watchman's clock is that through the system adopted by using a male and female die, it is possible, by making a slight deviation in the position of the figures, to produce a clock in which the keys of another clock of even the same make cannot be used.

This feature is a great advantage in establishments where more than one clock is in use.

Watchman's clock systems whether electrical or portable, in which the record is in the form of pin pricks are not tamper-proof. To prove this, place a dial of any such system downward upon an ordinary ink blotter and witness with what ease a dial can be punched entire, or missed stations filled in by the simple use of a needle or even the pointed end of an ordinary sticker file found in every office.

A Newman Dial cannot be manufactured or missed stations filled in, except by actually taking the clock to the stations.

The case of this portable watchman's clock is substantially made of aluminum, combining lightness and strength. Has tight-fitting hinged lid and re-enforced key-hole. The use of aluminum prevents tarnish or injury from acids or grease. The case is equipped with a pricking device which registers upon the paper dial each and every opening and closing of the clock, such registration showing the exact time of opening and closing.

The movement of the clock is similar to that of a fine pocket watch, being jeweled and having thick plates and pillar posts, thus minimizing damage in case of accident. Pinions and pivots are made of tool steel, highly polished. Cut wheels. The hair spring is non-magnetic and non-corrosive.

The face of dial is made of silvered metal, 2½ inches diameter with plain black hands, so that it is easily readable at night and results in a better dial record than one without it.

The Newman Key cannot be duplicated, except by the manufacturer. Each key has a different raised number upon the right angle flange, which when registering fits snugly and properly into the keyguide and meets the female die or matrix, resulting in a perfectly embossed figure denoting the station number and the exact time at which it was visited.

STATION BOX AND KEY

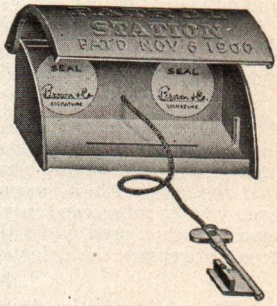


Fig. 12580B

Price,	Complete,	6-station	Size			each	68.00
"	"	9	"	"		"	71.50
"	"	12	"	"		"	75.00
"	"	16	"	"		"	80.00
"	"	20	"	"		"	87.50
"	"	25	"	"		"	97.50
"	"	30	"	"		"	107.50
"	"	35	"	"		"	117.50

LEATHER BELTING

IMPERIAL SINGLE AND DOUBLE BELTING

Fig. 30354A

Imperial Single and Double Belting is strictly first quality, center stock, made in all widths and plies.

Adapted for general requirements in machine shops, knitting mills, foundries, and for other work where a strictly first quality belting is required.

PHOENIX MOTOR BELTING

Fig. 30354B

Phoenix Motor Belting is strictly first quality center stock, made in light doubles only. Adapted particularly for use on motors, fans, blowers and other high speed machinery where belting is operated over comparatively small pulleys, or for general machine shop requirements where a light weight double oak-tanned leather belt is required.

GUARANTEE

We guarantee that the leather used in the construction of the foregoing brands of belting is oak-tanned by the long time method, and in the currying process nothing but pure animal greases are used. Should the belting prove defective in material or workmanship when used under the proper mechanical conditions, we will, if notified promptly, repair or replace the defective parts at no expense to the purchaser.

WETITE LEATHER BELTING

Fig. 30354C

Wetite Brand of Leather Belting is constructed from choice oak-tanned center stock leather and put together with Wetite cement which is absolutely waterproof. Wetite Waterproof Belting is especially suited for use where there is dampness and water, or for exposure to climatic conditions and other agencies which are destructive to regular cemented belting. Because of the great strength of Wetite Cement, the belting is also particularly adapted for use on unusually hard drives with high speed over small pulleys and the like, such as are found in wood-working plants, saw and planing mills, etc.

Wetite Single is adapted for use on all drives where a single leather belt of heavy first quality is required and is suitable for use in foundries, machine shops, laundries, creameries and all classes of wet grinders.

Wetite Planer Double is a light weight, waterproof belt and is especially adapted to drives located in damp places and on comparatively small pulleys, such as motor extractors, or on any other drives where a light double waterproof belt may be required.

WETITE GUARANTEE

We guarantee that the leather used in the construction of the Wetite Belting is oak-tanned by the long-time method, and in the currying process nothing but pure animal greases are used. Both brands are furthermore guaranteed to be absolutely waterproof; that the laps will not loosen or the plies separate if the belting is exposed to moisture or even wholly submerged in water. Should the belting prove defective in material or workmanship when used under the proper mechanical conditions, we will, if notified promptly, repair or replace the defective parts at no expense to the purchaser.

MASSCO BELTING SERVICE

We are in position to render any belting service which may be required, such as oil dressing leather belts, stitching the laps, repairing or re-building large or small belts, making belts endless; in fact, any service which a manufacturer's distributor is in position to furnish.

The services of our engineering department are at the disposal of those who are contemplating the erection of new plants, or alterations or additions to present equipment in order to assist them in determining the type and weight of belt best adapted to operate various drives, thereby reducing their belting costs to a minimum. We are in position to furnish all widths of belts in the various plies and brands from stock at short notice, thereby insuring prompt service and minimum delays.

LEATHER BELTING

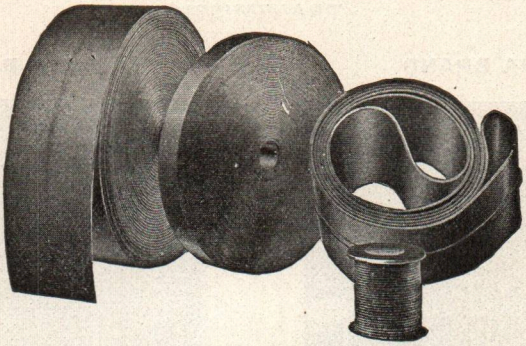


Fig. 963A

Adopted November 21, 1906

Width Inches	Price, per Foot Single	Price, per Foot Double	Width Inches	Price, per Foot Single	Price, per Foot Double	Width Inches	Price, per Foot Single	Price, per Foot Double
1/2	.12	.24	6 1/2	1.56	3.12	27	6.48	12.96
5/8	.15	.30	7	1.68	3.36	28	6.72	13.44
3/4	.18	.36	8	1.92	3.84	29	6.96	13.92
7/8	.21	.42	9	2.16	4.32	30	7.20	14.40
1	.24	.48	10	2.40	4.80	32	7.68	15.36
1 1/4	.30	.60	11	2.64	5.28	34	8.16	16.32
1 1/2	.36	.72	12	2.88	5.76	36	8.64	17.28
1 3/4	.42	.84	13	3.12	6.24	38	9.12	18.24
2	.48	.96	14	3.36	6.72	40	9.60	19.20
2 1/4	.54	1.08	15	3.60	7.20	42	10.08	20.16
2 1/2	.60	1.20	16	3.84	7.68	44	10.56	21.12
2 3/4	.66	1.32	17	4.08	8.16	46	11.04	22.08
3	.72	1.44	18	4.32	8.64	48	11.52	23.04
3 1/4	.78	1.56	19	4.56	9.12	50	12.00	24.00
3 1/2	.84	1.68	20	4.80	9.60	52	12.48	24.96
3 3/4	.90	1.80	21	5.04	10.08	54	12.96	25.92
4	.96	1.92	22	5.28	10.56	56	13.44	26.88
4 1/2	1.08	2.16	23	5.52	11.04	60	14.40	28.80
5	1.20	2.40	24	5.76	11.52	64	15.36	30.72
5 1/2	1.32	2.64	25	6.00	12.00	68	16.32	32.64
6	1.44	2.88	26	6.24	12.48	72	17.28	34.56

ROUND BELTS

Diameter.....inches	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1
Price, Twisted.....per foot	.08	.12	.17	.22	.27	.38	.48	.60	.80	.96
" Solid..... "	.07	.09	.14	.18	.24	...	...	...	...	...

ROUND BRAIDED BELTS

Diameter.....inches	3/8	1/2	5/8	3/4	7/8	1
Price.....per foot	.27	.38	.48	.60	.80	.96

MASSCO RUBBER BELTING

TRANSMISSION

ALPHA BRAND

Fig. 30606A

FEATURES

The harder the service, the more satisfactory and economical this belting will prove itself. Maximum gripping power, great tensile strength and extreme flexibility. Moisture-proof. Absorbs shocks and strains. Runs absolutely true. Friction-surface, gum cushion type.

FABRIC

Duck of special design. Extra weight and extra body such as found in no other make. Excess stretch eliminated. Strong gripping power affords fasteners and lacings.

FRICTION

Powerful adhesion, absolutely prevents ply separation. Permanent vitality, strong and elastic. Adequately protects duck from deterioriation.

GUM CUSHION

Heavy gum cushion beneath top ply excludes moisture on drives, where outer ply is subject to much wear. Gives unusual flexibility to belt. Fits the belt for drives having small pulleys, cone pulleys, quarter turns or idler attachments. Lessens strain on inner plies over short bends. Absorbs shocks.

BETA BRAND

Fig. 30606B

Beta is just the belt for all general requirements, is moderate in price, and gives a maximum of service for its cost, representing a time tested value.

Rubber covered type, also friction covered type.

Stitched or unstitched. Beta ordinarily comes unstitched, but if desired can be furnished in the stitched form, which makes an excellent value for this type of belt.

GAMMA BRAND

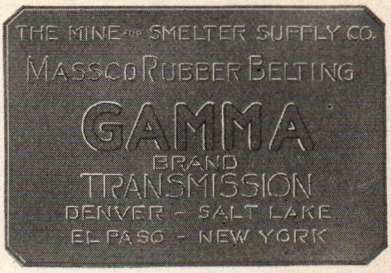


Fig. 30606C

Our standard commercial grade for all general and ordinary service.

Gamma for lighter work on general machine drives, has rendered an unusually good account of itself. Although it is one of our lower priced grades, it is still much better than many of the competitive grades on the market. We can safely recommend Gamma for all service where the duty is normal. Rubber covered type.

MASSCO RUBBER BELTING

TRANSMISSION

REVISED BELTING LIST

Adopted by the Mechanical Rubber Goods Manufacturers' Division of The Rubber Association of America, Inc., May 21st, 1918.

PRICE, PER FOOT, EFFECTIVE JULY 1 1918

Size, In.	2-ply	3-ply	4-ply	5-ply	6-ply	7-ply	8-ply	9-ply	10-ply	11-ply	12-ply
1	.18	.20	.24	....	.....	.....	.....	.....	.....	.....	.....
1¼	.23	.26	.30	....	.....	.....	.....	.....	.....	.....	.....
1½	.27	.31	.36	.45	.....	.....	.....	.....	.....	.....	.....
1¾	.32	.36	.42	.53	.....	.....	.....	.....	.....	.....	.....
2	.34	.39	.46	.58	.69	.....	.....	.....	.....	.....	.....
2½	.42	.48	.56	.70	.84	.....	.....	.....	.....	.....	.....
3	.48	.55	.65	.81	.98	.....	.....	.....	.....	.....	.....
3½	.57	.65	.76	.95	1.14	.....	.....	.....	.....	.....	.....
4	.61	.70	.82	1.03	1.23	1.44	.....	.....	.....	.....	.....
4½	...	.78	.92	1.15	1.38	1.61	.....	.....	.....	.....	.....
5	...	.87	1.02	1.28	1.53	1.79	.....	.....	.....	.....	.....
6	...	1.04	1.22	1.53	1.83	2.14	2.44	2.75	3.06	3.36	3.66
7	...	1.22	1.43	1.79	2.15	2.50	2.86	3.22	3.58	3.94	4.30
8	...	1.31	1.54	1.93	2.31	2.70	3.08	3.47	3.86	4.24	4.62
9	...	....	1.73	2.16	2.60	3.03	3.46	3.89	4.32	4.76	5.20
10	...	....	1.92	2.40	2.88	3.36	3.84	4.32	4.80	5.28	5.76
11	...	....	2.11	2.64	3.17	3.69	4.22	4.75	5.28	5.81	6.34
12	...	....	2.30	2.88	3.45	4.03	4.60	5.18	5.76	6.33	6.90
13	...	....	2.50	3.13	3.75	4.38	5.00	5.63	6.26	6.88	7.50
14	...	....	2.69	3.36	4.04	4.71	5.38	6.05	6.72	7.40	8.08
15	...	....	2.88	3.60	4.32	5.04	5.76	6.48	7.20	7.92	8.64
16	...	....	3.08	3.86	4.62	5.40	6.16	6.94	7.72	8.48	9.24
18	...	....	3.46	4.32	5.20	6.06	6.92	7.78	8.64	9.52	10.40
20	...	....	3.84	4.80	5.76	6.72	7.68	8.64	9.60	10.56	11.52
22	...	....	4.22	5.28	6.34	7.38	8.44	9.50	10.56	11.62	12.68
24	...	....	4.60	5.76	6.90	8.06	9.20	10.36	11.52	12.66	13.80
26	...	....	....	6.26	7.50	8.76	10.00	11.26	12.52	13.76	15.00
28	...	....	....	6.72	8.08	9.42	10.76	12.10	13.44	14.80	16.16
30	...	....	....	7.20	8.64	10.08	11.52	12.96	14.40	15.84	17.28
32	...	....	....	7.72	9.24	10.80	12.32	13.88	15.44	16.96	18.48
34	...	....	....	8.18	9.82	11.46	13.08	14.72	16.36	18.00	19.64
36	...	....	....	8.64	10.40	12.12	13.84	15.56	17.28	19.04	20.80
38	...	....	....	....	10.96	12.78	14.60	16.42	18.24	20.08	21.92
40	...	....	....	....	11.52	13.44	15.36	17.28	19.20	21.12	23.04
42	...	....	....	....	12.10	14.10	16.12	18.14	20.16	22.18	24.20
44	...	....	....	....	12.68	14.76	16.88	19.00	21.12	23.24	25.36
46	...	....	....	....	13.24	15.44	17.64	19.86	22.08	24.28	26.48
48	...	....	....	....	13.80	16.12	18.40	20.72	23.04	25.32	27.60
50	...	....	....	....	14.40	16.82	19.20	21.62	24.04	26.42	28.80
52	...	....	....	....	15.00	17.52	20.00	22.52	25.04	27.52	30.00
54	...	....	....	....	15.58	18.18	20.76	23.36	25.96	28.56	31.16
56	...	....	....	....	16.16	18.84	21.52	24.20	26.88	29.60	32.32
58	...	....	....	....	16.72	19.50	22.28	25.06	27.84	30.64	33.44
60	...	....	....	....	17.28	20.16	23.04	25.92	28.80	31.68	34.56

MASSCO RUBBER BELTING

CONVEYOR

ALPHA BRAND

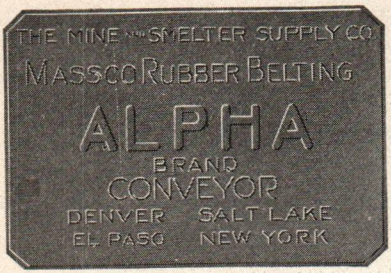


Fig. 30605A

BETA BRAND

Fig. 30605B

ALPHA BRAND

Features.—For the hardest service, long hauls, sharp, heavy, abrasive materials and where day-in-and-day-out operation is an important factor. Maximum vitality and long wear. Non-peeling and least take-up. Straight running. Troughs without load. No guide idlers necessary. No spillage. Will not stretch.

Tough Rubber Cover.—Compounded to withstand the abrasion from hard, sharp, heavy materials. Tough and resilient. Amply protects the fabric body from moisture or other weakening elements.

Long-lived Friction.—Prevents ply separation. Will last as long as the balance of the belt structure.

Special Edge Construction.—Will not peel or break loose. Protects fabric from any abrasive wear along the sides. Will not soften up and tear.

Sturdy Fabric.—Specially woven duck. Maximum strength lengthwise. Extreme flexibility crosswise.

Low Service Cost.—On the basis of continuous service and tonnage carried, Alpha will cost less than any belt made.

Prices upon application.

BETA BRAND

Beta will meet all general requirements. For installations which do not require belting of a maximum quality.

Service.—Will give splendid service under normal conditions.

Features.—Has all the special features which are put into Massco conveyor belts. Moderate in price and economical in operation.

Beta is not a low grade belt. Do not confuse it with the cheaper grades that over-run the market.

Beta is from 15 to 30 per cent better in quality than the standard conveyor belts of many manufacturers.

Prices upon application.

MASSCO RUBBER BELTING

ELEVATOR

ALPHA BRAND

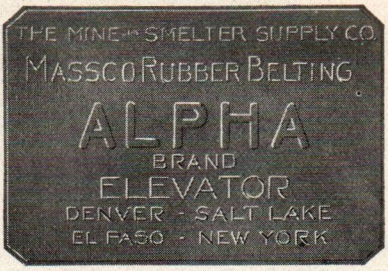


Fig. 30607A

In wet elevator service where the work is heaviest and most severe, there is no better belt than Alpha with its friction of unusual vitality, tenacity and elasticity.

Alpha Brand is built of a special weave and weight of elevator duck. It is made in the friction surface type without covers. The duck is well protected by a tough, springy gum cushion beneath the first ply.

Prices upon application.

BETA BRAND

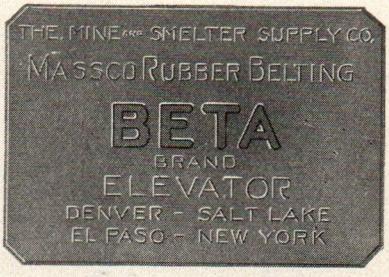


Fig. 30607B

Designed for hard service in dry elevators. Beta Brand also performs effectively in wet elevators under normal conditions.

The same selected duck used in Alpha gives Beta its freedom from stretch and its great strength.

The plies are held firmly together by live elastic friction and are protected by a covering of durable compound of standard thickness. A heavy cover will be furnished if desired.

Prices upon application.

STITCHED CANVAS BELTING

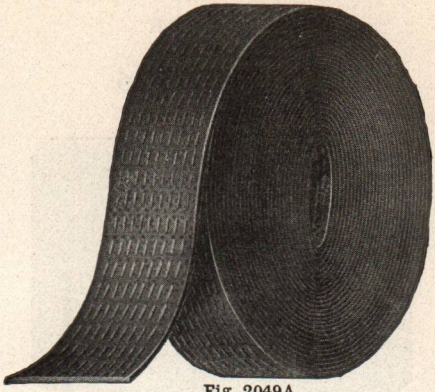


Fig. 2049A

ADOPTED OCTOBER 1, 1918—For Sizes Not Listed, Take Nearest Higher Size.

Width In.	4-ply	5-ply	6-ply	8-ply	10-ply
1	.20	...	...	....	....
1½	.30	...	...	....	....
2	.39	.49	.59	....	....
2½	.48	.60	.72	....	....
3	.57	.71	.86	....	....
3½	.65	.81	.98	....	....
4	.74	.93	1.11	1.48	....
4½	.81	1.01	1.22	1.62	....
5	.90	1.13	1.35	1.80	....
6	1.05	1.31	1.58	2.10	....
7	1.20	1.50	1.80	2.40	....
8	1.35	1.69	2.03	2.70	....
9	1.49	1.86	2.24	2.98	....
10	1.62	2.03	2.43	3.24	....
11	1.76	2.20	2.64	3.52	....
12	2.05	2.57	3.08	4.10	5.13
13	2.15	2.69	3.23	4.30	5.37
14	2.31	2.90	3.47	4.62	5.78
15	2.48	3.09	3.72	4.96	6.20
16	2.64	3.30	3.96	5.28	6.60
18	2.97	3.72	4.46	5.94	7.43
20	3.30	4.13	4.95	6.60	8.25
22	3.63	4.55	5.45	7.26	9.08
24	3.96	4.95	5.94	7.92	9.90
26	4.68	5.85	7.02	9.36	11.70
28	5.04	6.30	7.56	10.08	12.60
30	5.40	6.75	8.10	10.80	13.50
32	5.76	7.20	8.64	11.52	14.40
34	6.12	7.65	9.18	12.24	15.30
36	6.48	8.10	9.72	12.96	16.20
38	7.41	9.27	11.12	14.82	18.53
40	7.80	9.75	11.70	15.60	19.50
42	8.19	10.25	12.29	16.38	20.48
44	8.58	10.73	12.87	17.16	21.45
46	8.97	11.22	13.46	17.94	22.43
48	9.36	11.70	14.04	18.72	23.40

Charge for splice on endless belts. All belts 16 inches wide and under, seven feet is the minimum charge. Belts over 16 inches wide, the charge is to be the equivalent of five times the width of the belt.

BELT DRESSING AND CEMENT

DIXON'S SOLID BAR BELT DRESSING

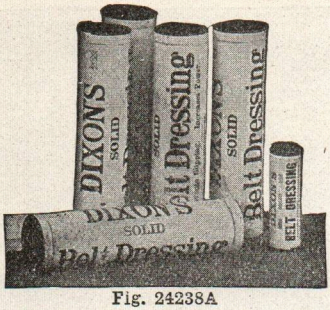


Fig. 24238A

Positively stops all slipping. Put up in bars 2x8 inches, a shape and size very convenient for the hand. It is applied to belts without stopping the machinery. The composition of this dressing is such that it can never cause any clogging, hardening or cracking of belt with years of use.

Price.....per bar .40
" Case of 25 Bars....per case 8.25

CROWN LEATHER BELT CEMENT

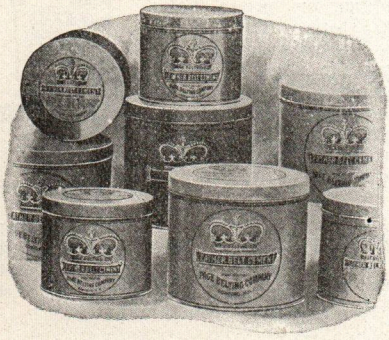


Fig. 24238B

Put up in air-tight cans and guaranteed to keep in all climates.

To prepare for use it should be dissolved in an ordinary glue kettle, such as is used by cabinet makers, or it can be dissolved by putting into a tin dish, set in another tin dish. Apply hot to the surface of the leather; then apply pressure, if possible, otherwise, hammer or rub down.

Put up in 1, 2, 5 and 10-pound cans.

Prices upon application.

STEPHENSON BAR BELT DRESSING

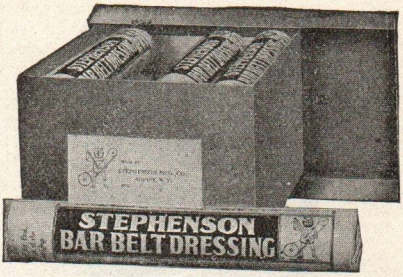


Fig. 24238C

No matter what kind of belts are used, there is a special brand of Stephenson Bar Belt Dressing made for this particular belt; each is an entirely different and distinct preparation from the other. They are clean to handle, always ready to use, easily applied, act instantly, prevent slipping, preserve belts and prolong their life.

These dressings are put up in solid or stick form, in 1-pound bars, size sticks 2x11¼ inches, 12 sticks to the box.

Size, Box.....lbs.	12	30	50	100
Price, Net..per lb.	.50	.48	.46	.44

BELTINE

Fig. 24238D

Stops slipping and preserves leather, cotton, and other belting.

The manufacturers guarantee Beltine to be free from tar, rosin, glue, chalk, animal or rancid fish oils or other ingredients injurious to belts.

Size of Cans	1-gal.	3-gal.
Price.....per can	4.00	10.00
Size of Cans.....	6-gal.	12-gal.
Price.....per can	17.50	34.00
" in Barrels.....per pound		.30

BELT DRESSING AND CEMENT

LIQUID

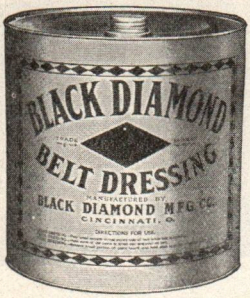


Fig. 17552A

STICK

Fig. 17552B

No. 1, liquid form. For leather belts running under ordinary conditions.

No. 2, liquid form. Dusty leather dressing for dusty plants.

No. 4, stick form. Leather dressing stops slipping and is convenient to use.

No. 11, liquid form. Dusty rubber dressing for dusty plants.

No. 12, stick form. Rubber belt dressing stops slipping and is convenient to use.

No. 21, liquid form. Balata dressing to pull and preserve.

No. 22, stick form. Balata dressing stops slipping and is convenient to use.

No. 30, liquid form. Cotton dressing to pull and preserve.

No. 31, liquid form. Dusty cotton dressing for ordinary dusty plants.

No. 32, liquid form. Cotton belt preserver to preserve, soften and clean belts in extremely dusty places. Has no pull.

No. 33, stick form. Cotton belt dressing.

CLING-SURFACE
BELT PRESERVATIVE

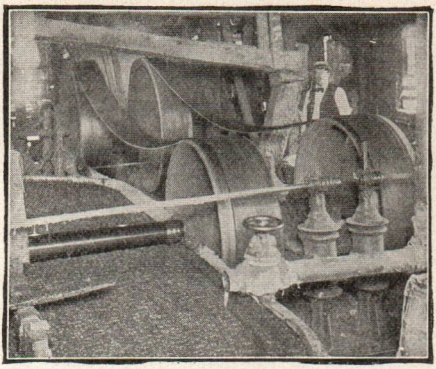


Fig. 17552C

Cling-Surface is a preservative filler for leather and cotton belts and ropes. It penetrates and keeps the whole belt or rope pliable, waterproof and preserved, leaving the surface clean. It can also be used for good rubber or balata belts. It stops all slipping, so all belts can be run easy or slack and pull fullest loads. Is not sticky and contains no rosin nor harmful material. Put up in 10, 25 and 50-pound tight cans.

Fig. 17552D

Price	10-pound	cans		.47
"	25	"	"	.40
"	50	"	"	.45

BELT CEMENT

It takes very little cement to join the laps, and the time it takes costs a good deal more than the cement. Therefore, it does not pay to waste your time on cheap stuff that does not hold, and, giving away in a short time, requires the work to be done over with no better results.

It is put up in 1, 2 and 5-pound cans, air-tight, and will keep any length of time. Full directions on every can.

BELT LACING, ETC.

LACE LEATHER

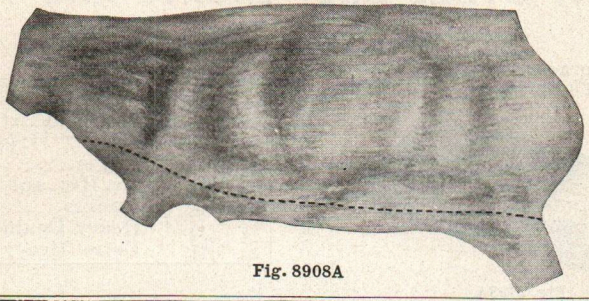


Fig. 8908A

Price, Rawhide .....per sq. ft.	....	Price, Tanned.....per sq. ft.	....	Price, Waterproof, per sq. ft.	....

CUT LACING—TANNED OR RAWHIDE

Fig. 8908B

Width .....inches	1/4	5/16	3/8	7/16	1/2	5/8	3/4
Price.....per 100 feet	2.50	3.00	3.75	4.50	5.50	6.50	7.50

METALLIC BELT LACING

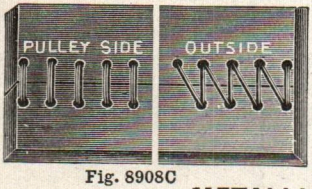


Fig. 8908C

EMPIRE PATENT LACE CUTTER

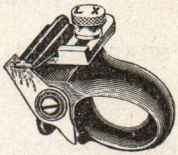


Fig. 8908D

METALLIC BELT LACING

Number	0	1	2	2	3
For Belts.....	Single	Single	Single	Double	Double
Width of Belt..inches	2½ and under	3 to 5	6 to 12	6 and under	6 and over
Price.....per 100 feet	2.00	2.00	2.00	2.00	2.00

EMPIRE PATENT LACE CUTTERS

Price .....per dozen	6.00

L. X. IMPROVED STEEL BELT COUPLINGS

FOR ROUND BELTS OR CORDS

TRADE MARK

Fig. 8908E

Diameter ...inches	1/8	5/32	3/16	7/32	1/4	9/32	5/16	11/32	3/8	7/16
Price....per dozen	3.00	3.00	2.50	2.50	2.00	2.50	2.50	3.00	3.00	3.50
Diameter ...inches	1/2	9/16	5/8	11/16	3/4	7/8	1	1 1/8	1 1/4	....
Price ....per dozen	4.00	5.00	6.00	7.50	9.00	13.00	18.00	22.00	26.00	....

Each size packed in a neat wooden box, with slide cover, containing one dozen pairs.

BRISTOL'S PATENT STEEL BELT LACING AND HOOKS

No. 1 STYLE, FOR LEATHER BELTS

Packed in Assorted Widths
Each Box Enough for 100 Inches of Belt

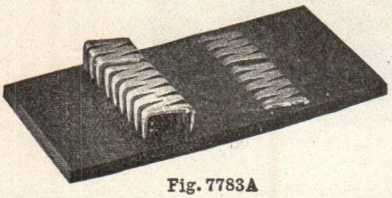


Fig. 7783A

Size No.	Thickness and Kind of Belt	Per Box
00	1/16 to 1/8 in., Split and Extra Light	1.00
0	1/8 " 3/16 " " " Light.....	1.00
1	3/16 " 1/4 " Single.....	1.50
2	1/4 " 5/16 " Ex. Hvy. and Wide Single	2.00
3	5/16 " 3/8 " Double.....	2.50
4	3/8 " 7/16 " Heavy Double.....	3.00
5	7/16 " 9/16 " Extra Heavy Double	3.50

No. 11 STYLE, FOR WOVEN BELTS

Packed in Assorted Widths
Each Box Enough for 100 Inches of Belt

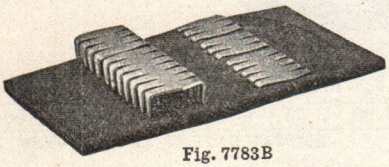


Fig. 7783B

Size No.	Thickness and Kind of Belt	Per Box
100	1/16 to 1/8 in., Lightest Rbr. and Cot.	1.00
10	1/8 " 3/16 " 2-ply Rbr. and Cot...	1.00
11	3/16 " 1/4 " 3 " " " " ...	1.50
12	1/4 " 5/16 " 4 " " " " ...	2.00
13	5/16 " 3/8 " 5 " " " " ...	2.50
14	3/8 " 7/16 " 6 " " " " ...	3.00
15	7/16 " 9/16 " 7 " " " " ...	3.50
17	1/2 " 5/8 " 8 " " " " ...	4.95
19	11/16 " 13/16 " 10 " and Ex. Hy. Conveyor	6.05

STAGGERED POINT STYLE, FOR ALL KINDS OF BELTS

Packed in Assorted Widths
Each Box Enough for 100 Inches of Belt

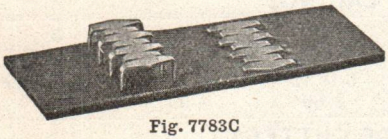


Fig. 7783C

Size No.	Thickness and Kind of Belt	Per Box
1100	1/16 to 1/8 in., Split Lth. and Lt. Rbr. and Cot.	.90
110	1/8 " 5/32 " " " " " " " " "	1.00
110½	5/32 " 1/4 " Sgl. " " 2-ply " " "	1.25
111	3/16 " 1/4 " " " " " 3 " " " "	1.50
112	1/4 " 5/16 " Ex. Hy. and Wide Sgl. Lth., 4-ply Rbr. and Cot.....	2.00
113	5/16 " 3/8 " Dbl. Lth., 5-ply Rbr. and Cot...	2.50
114	3/8 " 7/16 " Hy. Dbl. Lth. and 6-ply Rbr. and Cot.....	3.00
115	7/16 " 9/16 " Ex. Hy. Dbl. Lth., and 7-ply Rbr. and Cot.....	3.50
117	1/2 " 5/8 " Conveyor and 8-ply Rbr. and Cot.	4.95
119	5/8 " 13/16 " 10-ply and Ex. Hy. Conveyor	6.05

STAGGERED POINT STYLE, FOR ALL KINDS OF BELTS

Three-Point Widths, Long and Short Side Hooks
Each Box Contains 50 Pieces

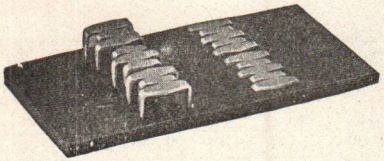


Fig. 7783D

Size No.	Thickness and Kind of Belt	Per Box
3100	1/16 to 1/8 in., Split Lth. and Lt. Rbr. and Cot.....	.40
310	1/8 " 5/32 " " " " " " " " "	.50
310½	5/32 " 1/4 " Sgl. " " 2-ply " " "	.60
311	3/16 " 1/4 " " " " 3 " " " "	.70
312	1/4 " 5/16 " Ex. Hy. and Wide Sgl. Lth. and 4-ply Rbr. and Cot.....	1.10
313	5/16 " 3/8 " Dbl. Lth. and 5-ply Rbr. and Cot....	1.70
314	3/8 " 7/16 " Hy. Dbl. Lth. and 6-ply Rbr. and Cot.	2.30
315	7/16 " 9/16 " Ex. Hy. Dbl. Lth. and 7-ply Rbr. and Cot.	3.50
317	1/2 " 5/8 " Conveyor and 8-ply Rubber and Cot..	5.50
319	5/8 " 13/16 " 10-ply and Extra Heavy Conveyor...	9.00

STEEL BELT LACING

20TH CENTURY STEEL BELT LACING

Illustrations Actual Size

No. A1

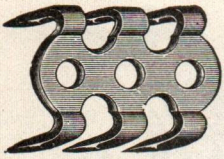


Fig. 30388A

No. 2

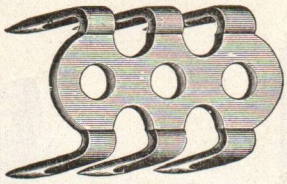


Fig. 30388B

No. 10

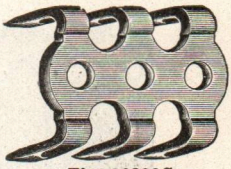


Fig. 30388C

No.	Kind of Belt	Price per Box
A1	Light Single Leather Belt....	1.25
1	Medium Heavy Single Leather Belt.....	1.50
2	Extra Heavy and Wide Single, also for Light Double.....	2.00
3	Double Leather Belt.....	2.50
4	Heavy Double Leather Belt..	3.00
10	2-ply, Rubber or Cotton.....	1.10

No.	Kind of Belts	Price per Box
11	3-ply, Rubber or Cotton.....	1.65
12	4- " " " "	2.20
12sp	Extra Heavy—4-ply Rubber or Cotton..	2.50
13	5-ply, Rubber or Cotton.....	2.75
14	6 to 7-ply, Rubber or Cotton	3.30
15	8 to 10-ply, " " "	3.85
17	For all Kinds of Belts, $\frac{5}{8}$ to $\frac{3}{4}$-inch thick	4.95
19	" Largest and Heaviest Belts $\frac{3}{4}$ to 1-in. thick	6.05

Nos. A1, 1, 2, 3, 10, 11 and 12, packed 100 inches in a box, assorted lengths, unless otherwise ordered. (This means each box contains enough lacing to connect 100 inches in width of belt). Nos. 4, 12 special, 13, 14, 15, 17 and 19 are made only in lengths having 3 teeth. Keep this in mind and avoid confusion in ordering.

ALLIGATOR STEEL BELT LACING

ENLARGED VIEW OF SECTIONAL STEEL ROCKER HINGE PIN

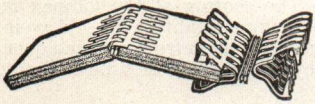


Fig. 30388D

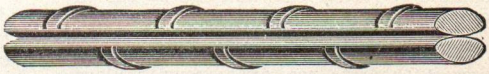


Fig. 30388E

Box No.	Lacing No.	Thickness of Belt Inches	Description Boxed Complete with Pins	Length of Section Inches	Width of Belt will Lace Inches	Price per Box
G	25	$\frac{3}{16}$ to $\frac{7}{32}$	Medium and Heavy Single Leather, 3-ply Rubber or 4-ply Cotton.....	12	96	2.25
L	27	$\frac{7}{32}$ to $\frac{9}{32}$	4-ply Rubber or Cotton.....	12	96	2.50
M	35	$\frac{9}{32}$ " $\frac{5}{16}$	Light Double Leather, 5-ply Rubber, Cotton and Balata.....	8	32	1.15
N	35	$\frac{9}{32}$ " $\frac{5}{16}$		12	48	1.70
U	45	$\frac{5}{16}$ " $\frac{3}{8}$	Double Leather, 6-ply Rubber and Cotton.....	12	48	2.25
W	55	$\frac{3}{8}$ " $\frac{7}{16}$	Wide Heavy Double Leather, 6 or 7-ply Rubber and 8-ply Cotton.....	12	48	2.60
X	65	$\frac{7}{16}$ " $\frac{1}{2}$	$\frac{1}{2}$-inch Leather, 7 and 8-ply Rubber and Fabric...	12	48	3.00
....	75	$\frac{1}{2}$ " $\frac{5}{8}$	10-ply Rubber or Cotton.....	12	48	4.00

Each belt lacing section is 12 inches long. Nos. G-25, L-27, N-35 and U-45 are packed with twisted rawhide and steel rocker hinge pins, assorted. Nos. W-55, X-65 and 75 are packed only with steel rocker hinge pins.

EXTRA HINGE PINS THAT CAN BE CUT TO SUIT

Price,	$\frac{1}{8}$-inch Rawhide or Steel Rocker Pins, for No. 25 Lacing, 12 in. Long per doz.			.45
"	$\frac{9}{64}$ " " " " " " " " " 27 " 12 "	"		.50
"	$\frac{5}{32}$ " " " " " " " " " 35 " 12 "	"		.50
"	$\frac{3}{16}$ " " " " " " " " " 45 " 12 "	"		.60
"	Steel Rocker Pins only, for No. 55 or No. 65 Lacing.....	"		.70
"	" " " " " " 75 Lacing.....	"		.85

CLIMAX FLEXIBLE STEEL BELT LACING

END VIEW OF BELT

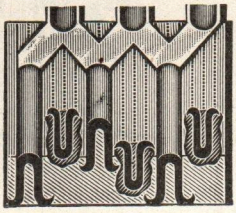


Fig. 16806A

COMPLETE COUPLING

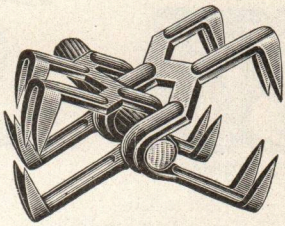


Fig. 16806B

Made with twin diagonal zig-zag or staggered penetrating prongs. Are self-clinching, acting the same as bifurcated rivets, giving double strength.

They are constructed so as not to remove the material from the belt. When driven through they clinch diagonally across the belt, thus merely separating the lengthwise fibers of the belt without destroying it. The patent roller bearing prevents longitudinal movement of the steel spindle or rocker pins and can be run in damp or wet places if desired.

The patent flexible diagonal bars will permit them to run over crown pulleys without breaking apart, this being one of the several exclusive features. The corrugated arms give additional stiffness and durability.

The prongs, being staggered, prevent the belt from cracking or breaking, that occurs when the old style of lacing is used, the teeth being in line and not having the zig-zag effect.

Climax lacing has in its construction all the good features of the old styles of flexible steel belt lacings, eliminating the defective ones and embodying exclusive patented features, such pronounced improvement accounting for its increased sale day by day.

The lacing, while self-clinching, is the quickest and simplest to apply. It requires no punching of holes and no part of the lacing extends beyond the edge of the belt, so the operator is not endangered where belts are shifted by hand. The lacing is perfectly smooth on both sides alike and they can be used with idlers.

The exclusive features of Climax Flexible Steel Belt Lacing are as follows:

First. — The teeth act as bifurcated rivets and are self-clinching.

Second. — The teeth are staggered and are not in line. This prevents the belt from cracking, which usually occurs where the old style of lacing is used with the teeth in line and the zig-zag effect is not obtained.

Third. — The scoring of the Climax is diagonal — being straight on the old style lacing, it prevents them from running over crown pulleys any length of time without breaking.

Fourth. — The arms are corrugated, preventing longitudinal movement of the patent steel spindles or rocker pins. Climax is the only fastener where three styles of pins are used.

Only a hammer is needed to apply this lacing. The belt may be shortened or lengthened quickly and easily without destroying coupler.

Illustrations show lacing in actual size. It is necessary in ordering this lacing that it be ordered by number. For example: No. 2548 means that the size of the fastener is No. 25 and that the box contains sufficient lacing for 48 inches in width of belt. No. 2596 means that the size of the fastener is No. 25 and that the box contains sufficient lacing for 96 inches in width of belt.

The first two figures represent the number of the fasteners while the last two figures are the number of inches of belt in width that the fasteners in each box will lace.

CLIMAX FLEXIBLE STEEL BELT LACING

SIZE No. 25

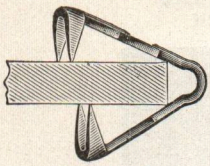


Fig. 16807A

For belts $\frac{1}{8}$ to $\frac{7}{32}$ inches thick.

BOX No. 2548

Packed in 12-inch lengths containing sufficient lacing for 48 inches in width of belt, complete with rawhide pins, patent steel spindles and rocker pins.
Price.....per box **1.00**

BOX No. 2596

Packed in 12-inch lengths containing sufficient lacing for 96 inches in width of belt, complete with rawhide pins, patent steel spindles and rocker pins.
Price.....per box **2.00**

BOX No. 2748

For belts $\frac{1}{4}$ to $\frac{9}{32}$ inches thick.
Packed in 12-inch lengths containing sufficient lacing for 48 inches in width of belt, complete with rawhide pins, patent steel spindles and rocker pins.
Price.....per box **1.15**

BOX No. 2796

Packed in 12-inch lengths containing sufficient lacing for 96 inches in width of belt. Complete with rawhide pins, patent steel spindles and rocker pins.
Price.....per box **2.25**

BOX No. 3524

For belts $\frac{9}{32}$ to $\frac{5}{16}$ inches thick.
Packed in 12-inch lengths containing sufficient lacing for 24 inches in width of belt. Complete with rawhide pins, patent steel spindles and rocker pins.
Price.....per box **.75**

BOX No. 3548

Similar to above with 48 inches in width of lacing.
Price.....per box **1.50**

BOX No. 4524

For belts $\frac{11}{32}$ to $\frac{3}{8}$-inch thick.
Packed in 12-inch lengths. Sufficient for 24 inches in width of lacing, complete.
Price.....per box **1.00**

BOX No. 4548

Similar to above containing sufficient lacing for 48 inches, complete.
Price.....per box **2.00**

BOX No. 6524

For belts $\frac{3}{8}$ to $\frac{1}{2}$-inch thick.
Packed in 12-inch lengths containing sufficient lacing for 24 inches in width of belt. Complete with patent steel spindles and rocker pins.
Price.....per box **1.30**

BOX No. 6548

Similar to above containing sufficient lacing for 48 inches in width of belt. Complete with patent steel spindles and rocker pins.
Price.....per box **2.60**

RAWHIDE PINS

Fig. 16807B

No. 25, $\frac{9}{64}$-in., for No. 25 Lacing..doz.		.45
" 27, $\frac{5}{32}$ " " " 27 " .. "		.50
" 35, $\frac{11}{64}$ " " " 35 " .. "		.50
" 45, $\frac{13}{64}$ " " " 45 " .. "		.60
Assorted, 3–25, 4–27, 3–35, and 2–45..		.50

STEEL ROCKER PINS

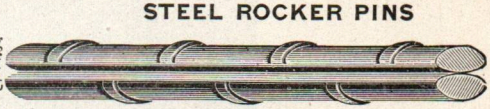


Fig. 16807C

Can be run in water, lugs on back of pin engage loops of lacing, preventing it from working out.

No. 25, for No. 25 Lacing.....doz.	.45
" 27, " " 27 " ..... "	.50
" 35, " " 35 " ..... "	.50
" 45, " " 45 " ..... "	.60
" 65, " " 65 " ..... "	.70
Assorted, 2–25, 2–27, 3–35, 3–45 and 2–65....	.55

PATENTED STEEL SPINDLES

Fig. 16807D

Can be run in water. Ball bearing joint locks automatically, preventing spindle from working out in service. This exclusive feature is patented. Can be successfully used under any conditions. Recommended for hard service.

No. 25, for No. 25 Lacing.....doz.	.45
" 27, " " 27 " ..... "	.50
" 35, " " 35 " ..... "	.50
" 45, " " 45 " ..... "	.60
" 65, " " 65 " ..... "	.70
Assorted, 2–25, 2–27, 3–35, 3–45 and 2–65....	.55

CRESCENT BELT FASTENERS AND SHANK RIVETS

CRESCENT BELT FASTENERS

MEDIUM, FOR GENERAL WORK

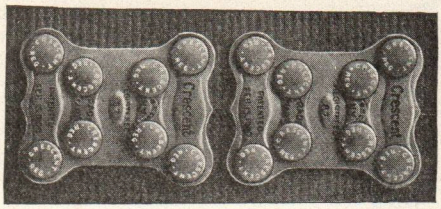


Fig. 8056A

Crescent Belt Fasteners are adapted for leather, balata, canvas, cotton, rubber and all fabric belting of every length, width and thickness. They are simple, strong and economical. The Crescent method of joining the ends of belting is the employment of patented, metallic plates binding the ends of the belt and fastened by self-piercing Crescent Rivets, which *cut no holes in the belt material, merely separating the fibres of warp in making the slots running lengthwise of the belt.* Unlike lace leather, wire lace or other styles of belt lacing, the Crescent method *does not remove any material,* but preserves the full strength of the belt.

LONG, FOR HEAVY WORK

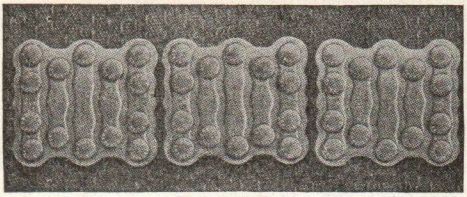


Fig. 8056B

From the illustration on this page it will be noted that the strain is equally distributed across the entire width of the belt, thus maintaining the maximum strength.

On the pulley side the finished joint is smooth, since the prongs of the rivets are firmly imbedded in the belt. There is no locking on the pulleys.

The illustrations of plates shown on this page are considerably reduced and are not in proportionate sizes to each other.

CRESCENT LARGE SHANK RIVETS

ACTUAL SIZE

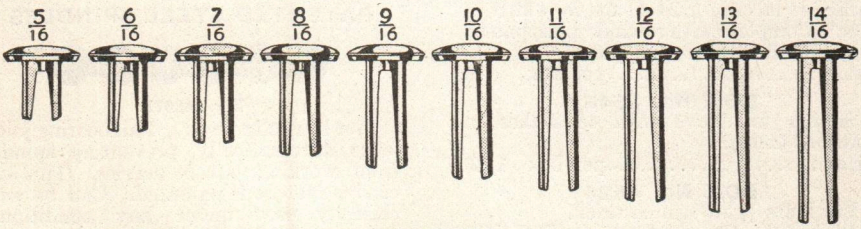


Fig. 8056C

Made for attaching Crescent Short, Medium, Special and Long Grip Plates. They should be used 3/16-inch longer than thickness of belting to allow for plate and proper clinch. For Crescent High Speed Plates, use Crescent Small Shank Rivets 3/16-inch longer than thickness of belt. For Crescent Jumbo Plates use Crescent Jumbo Rivet 5/16-inch longer than thickness of belt.

CRESCENT BELT FASTENERS

Crescent Plates combine exceptional strength with light weight. Being curved to conform to the pulleys they give the utmost power transmission.

Crescent Rivets are double pronged, of special construction and special metal; and designed especially for attaching Crescent Plates. Crescent Rivets are self-piercing; require no punched holes; remove no material; do not weaken the belt in any way. When clinched on the pulley side the prongs of Crescent Rivets imbed themselves in the material so that no metal touches the pulley.

Every Crescent Plate and Crescent Rivet is marked with our registered trade name "Crescent." For your protection see that the name "Crescent" is specified on all orders.

SERVICE CHART—CRESCENT BELT FASTENERS

FOR ALL KINDS AND MAKES OF BELTING OF EVERY LENGTH, WIDTH AND THICKNESS

LIGHT WORK Pulleys 3-Inch or Larger Belting ¾ Inch to 4 Ins. Wide	For ¾ & 1 In. of Belt Width, No. 25 Crescent Short Grip Plate, per gross,		2.88
	" 1½ " " " " 45 " " " " "		5.76
	" 2 " " " " 65 " " " " "		8.64
	" 2½ " " " " 85 " " " " "		11.52
	" 3 " " " " 805 " " " " "		11.52
GENERAL WORK Pulleys 6-Inch or Larger Belting 1½ Ins. to 8 Ins. Wide	For 1½ Ins. of Belt Width, No. 67 Crescent Medium Grip Plate, per gross		8.64
	" 2 " " " " 607 " " " " "		8.64
	" 2½ " " " " 87 " " " " "		11.52
	" 3 " " " " 107 " " " " "		14.40
	" 3½ " " " " 127 " " " " "		17.28
	" 4 " " " " 147 " " " " "		20.16
	For belting wider than 4 inches use two or more Crescent Plates of the same grip.		
GENERAL WORK Pulleys 9-Inch or Larger Belting 2 Ins. to 12 Ins. Wide	For 2 Inches of Belt Width, No. 63 Crescent Special Grip Plate, per gross		11.52
	" 2½ " " " " " 83 " " " " "		14.40
	" 3 " " " " " 103 " " " " "		17.28
	" 3½ " " " " " 123 " " " " "		20.16
	For belting wider than 3½ inches use two or more Crescent Plates of the same grip.		
HEAVY WORK Pulleys 12-Inch or Larger Belting 5 Ins. to 36 Ins. Wide	For 2½ Inches of Belt Width, No. 109 Crescent Long Grip Plate, per gross		17.28
	" 3 " " " " " 149 " " " " "		23.04
	" 3½ " " " " " 1409 " " " " "		25.92
	" 4 " " " " " 189 " " " " "		28.80
	For belting wider than 4 inches use two or more Crescent Plates of the same grip.		

ATTACH ALL THE ABOVE CRESCENT PLATES WITH CRESCENT LARGE SHANK RIVETS AS FOLLOWS:

For Belting 2/16 Inch Thick Use 5/16 Crescent Large Shank Rivets per gross		.70
" " 3/16 " " " 6 " " " " " "		.70
" " 4/16 " " " 7 " " " " " "		.80
" " 5/16 " " " 8 " " " " " "		.80
" " 6/16 " " " 9 " " " " " "		.90
" " 7/16 " " " 10 " " " " " "		.90
" " 8/16 " " " 11 " " " " " "		1.00
" " 9/16 " " " 12 " " " " " "		1.00
" " 10/16 " " " 13 " " " " " "		1.10
" " 11/16 " " " 14 " " " " " "		1.10

NOTE: To determine the quantity of Crescent Rivets needed to attach a given quantity of Crescent Plates, multiply the number of gross of Crescent Plates ordered by the bold face figures of the size number of the Crescent Plate. Example: 3 gross No. 12 B. F. Crescent Plates —3x1=36 gross of Crescent Large Shank Rivets required

HIGH-SPEED LIGHT WORK Pulleys 2-Inch or Larger	For ¾ & 1 Inch of Belt Width, No. 20 Crescent High-Speed Plate, per gross	2.88
	" 1 " " " " " 40 " " " " "	5.76
	" 1¼ " " " " " 44 " " " " "	5.76
	" 2 " " " " " 60 " " " " "	8.64
	For belting wider than 2 inches, use two or more Crescent Plates of the same grip.	
HIGH-SPEED LIGHT WORK Pulleys 4½-Inch or larger	For 1½ Inches of Belt Width, No. 66 Crescent High-Speed Plate, per gross	8.64
	For belting wider than 3 inches use two or more Crescent Plates of this size.	

FOR ATTACHING ALL CRESCENT HIGH-SPEED PLATES USE CRESCENT SMALL SHANK RIVETS AS FOLLOWS:

For Belting 2/16 Thick Use Size 5/16 Crescent Small Shank Rivets, per gross	.50
" " 3/16 " " " 6 " " " " " "	.50
" " 4/16 " " " 7 " " " " " "	.55
" " 5/16 " " " 8 " " " " " "	.55
" " 6/16 " " " 9 " " " " " "	.60
" " 7/16 " " " 10 " " " " " "	.60

NOTE: To determine the quantity of Crescent Rivets needed to attach a given quantity of Crescent Plates, multiply the number of gross of Crescent Plates ordered by the bold face figures of the size number of the Crescent Plate. Example: 5 gross No. 44 Crescent Plates—5x4=20 gross of Crescent Small Shank Rivets required.

EXTREMELY HEAVY WORK Large Pulleys Belting up to 72 Inches Wide	For 3 Inches of Belt Width, No. 1611 Crescent Jumbo Plate.....per gross	28.80
	" 4 " " " " " 2211 " " " ..... "	34.56

FOR ATTACHING CRESCENT JUMBO PLATES USE CRESCENT JUMBO RIVETS AS FOLLOWS:

For Belting 5/16 Inch Thick Use Size 10/16 Crescent Jumbo Rivets, per gross	1.25
" " 6/16 " " " " 11 " " " "	1.40
" " 7/16 " " " " 12 " " " "	1.40
" " 8/16 " " " " 13 " " " "	1.55
" " 9/16 " " " " 14 " " " "	1.55
" " 10/16 " " " " 15 " " " "	1.70
" " 11/16 " " " " 16 " " " "	1.70
" " 13/16 " " " " 18 " " " "	1.85

NOTE: To determine the quantity of Crescent Rivets needed to attach a given quantity of Crescent Plates, multiply the number of gross of Crescent Plates ordered by the bold face figures of the size number of the Crescent Plate. Example: 8 gross No. 2211 Crescent Plates—8x22=176 gross of Crescent Jumbo Rivets required.

Crescent Rivet Extractor No. 79.....each **1.00**

Be sure to specify enough Crescent Rivets for attaching the Crescent Plates ordered.

WASHER AND GASKET CUTTERS

ROSE WASHER AND GASKET CUTTERS

Nos. 0 AND 00

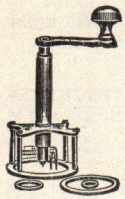


Fig. 8389A

Nos. 1 AND 2

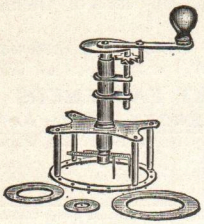


Fig. 8389B

Nos. 3 AND 4

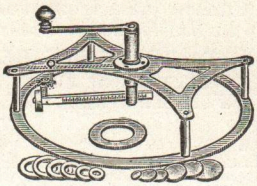


Fig. 8389C

Nos. 5 AND 6

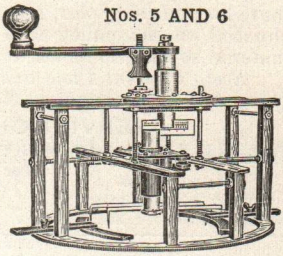


Fig. 8389D

These washer and gasket cutters will cut asbestos or any other packing material. They are made of steel and will last a lifetime. These cutters will save four fifths of a man's time over the old method, and will save one half the material you cut. They do accurate work. To prove these statements, just try one.

Number.....	0	00	1	2	3	4	5	6
Capacity..inches	⅜ to 2	*⅜ to 2	⅝ to 4½	1 to 10	4½ to 21	6 to 36	†1 to 10	†4 to 21
Price.....each	**1.15**	**1.50**	**3.75**	**10.00**	**23.00**	**32.00**	**36.00**	**82.00**

*In oxidized copper plate. †Round and oval. Glass cutter attachment, for Nos. 1 to 5, 2.00; No. 6, 3.50.

CENTURY GASKET AND WASHER CUTTERS

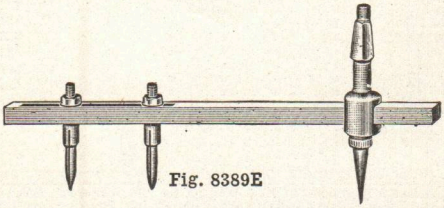


Fig. 8389E

Price, Century Gasket and Washer Cutters, Cuts up to 24 inches.....each **2.50**

HARGRAVE WASHER CUTTERS

These tools are made in two sizes, Nos. 405 and 406 to cut up to 4 inches, Nos. 407 and 408 to 6 inches. They are used for cutting gaskets out of leather, paper, rubber, sheet lead or thin wood, cutting both inner and outer circles at the same time, and adaptable to any ordinary brace. The body is malleable iron, pin of steel and the blade in the knife of the best tool steel, properly ground and tempered. Polished and japanned. The adjustment is made by knurled thumbscrew.

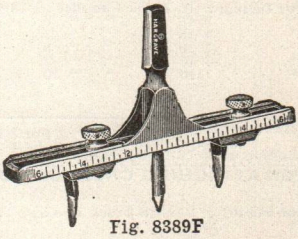


Fig. 8389F

Number.....	405 and 406	407 and 408
Capacity.....inches	½ to 4	½ to 6
Price, with Gauge.....per dozen	**12.00**	**14.00**
" without Gauge..... "	**10.00**	**12.00**

Knives only, 3.00 per dozen. Screws only, 1.00 per dozen.

BELT TOOLS

PUNCHES

SPRING

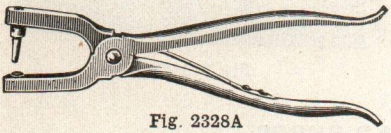


Fig. 2328A

REVOLVING SPRING

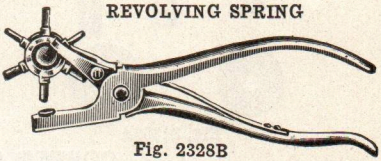


Fig. 2328B

SPRING

Style	Screw Tubes
Price, No. 21 ... per dozen	6.00

REVOLVING SPRING

Number of Tubes	4	6
Price, Revolving Punches ... per dozen	18.00	21.00
" Extra Tubes ... "	2.00	

ROUND AND OVAL

ROUND AND OVAL

Fig. 2328C

ROUND

Fig. 2328D

ROUND

ACTUAL SIZES OF HOLES

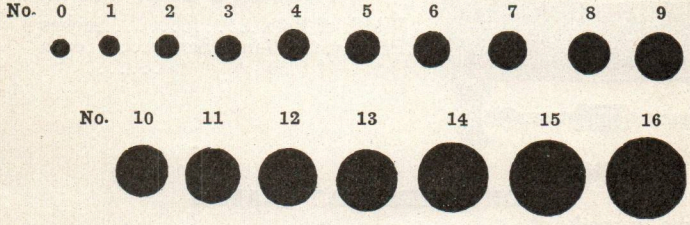


Fig. 2328E

Made of best tool steel, warranted.

Number	0	1	2	3	4	5	6	7	8
Size, Hole ... inches	5/64	3/32	7/64	1/8	9/64	5/32	11/64	3/16	13/64
Price ... per dozen	3.25	3.25	3.25	3.25	3.25	3.25	3.25	4.25	4.25
Number	9	10	11	12	13	14	15	16	....
Size, Hole ... inches	7/32	15/64	1/4	9/32	5/16	11/32	3/8	13/32	....
Price ... per dozen	4.25	5.25	5.25	5.25	6.25	8.25	8.25	8.25	....

Round and oval, carbon finish, polished, are packed in neat wooden boxes, 1 dozen in a box of each size.

BELT TOOLS

COPPER RIVETS AND BURRS

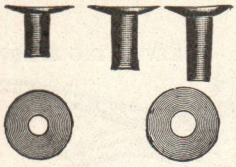


Fig. 31334A

RIVET SET

Fig. 31334B

COPPER RIVETS AND BURRS

Number	3 to 7	8	9	10	11	12	13	14	15
Price, in 1 or 4-lb. Boxes.....per lb..	.98	1.00	1.04	1.08	1.12	1.16	1.20	1.30	1.40
" "½" ¾ " " ..... "	1.04	1.06	1.10	1.14	1.18	1.22	1.26	1.36	1.46

RIVET SETS

Number	00	0	1	2	3	4	5	6	7	8
Size Hole.....inches	5/16	9/32	17/64	3 Ga.	9 Ga.	15 Ga.	21 Ga.	27 Ga.	33 Ga.	39 Ga.
For Iron Rivets..lbs.	14	10–12	8	6	4–5	2½–3	2	1½	1¼	¾
" Copper Rivets.No.	....	5	6	7	8	9	10–11	12	13	14
Price..... per doz.	9.00	9.00	7.50	7.50	6.00	6.00	4.50	4.50	3.75	3.75

BELT REAMER

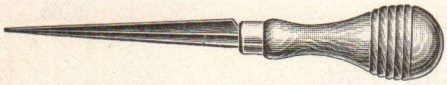


Fig. 31334C

LOTHROP'S BELT AWL

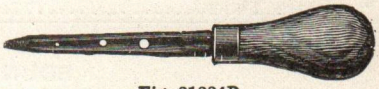


Fig. 31334D

Price, Oval Belt Awls	per dozen	3.50
" Round Belt Awls	"	3.60
" Belt Reamers	"	3.60
" Lothrop's Belt Awls	"	6.00

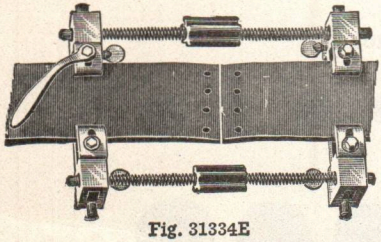


Fig. 31334E

PORTER'S BELT CLAMPS

Width of Belt	inches	2 to 20
Price, with 26-inch Screw	each	12.00
" " 60 " "	"	15.00

IRON SCREW BELT CLAMPS

The frame is made of rock maple, with jaws corrugated, which makes it practically impossible for belt to slip after having been properly placed in clamp. The screws have square threads and rapid pitch and are made of wrought iron.

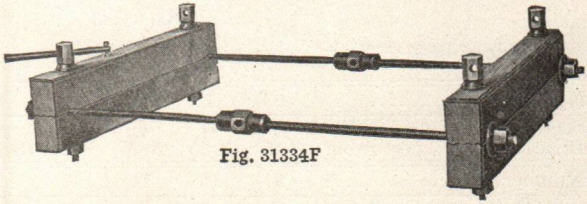


Fig. 31334F

These clamps are used for tightening and putting together large belts, and combine strength, simplicity and convenience.

Number	270	271	272	273
Size of Belt.....inches	6 to 12	12 to 18	18 to 24	24 to 36
Price.....each	8.00	10.00	12.00	18.00

HOSE

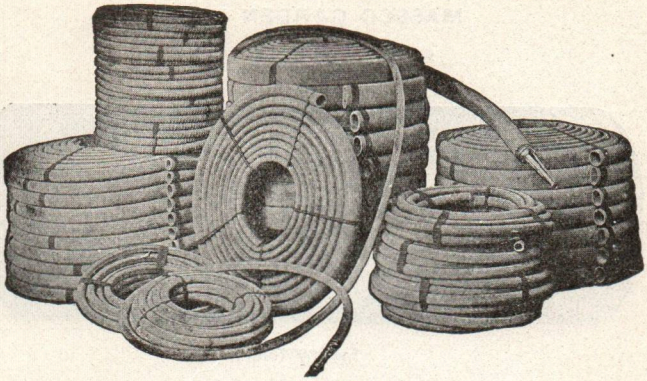


Fig. 4331A

WATER CONDUCTING HOSE

Two-ply hose, designed to conduct water under moderate pressure only. Sizes above 3-inch are mainly for tank hose; 3-ply hose, of medium strength, suitable for hydrants, garden and pump uses, street sprinkling, washing decks, etc.

Four-ply hose, recommended for all purposes where a particularly strong and reliable article is required.

Five and 6-ply hose, for use where great resistance to pressure or very severe service is required.

Internal Diam.....inches	½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾
Price, 2-ply.....per foot	.20	.25	.33	.42	.50	.58	.66	.75	.83	.92
" 3 " ..... "	.25	.30	.40	.50	.60	.70	.80	.90	1.00	1.10
" 4 " ..... "	.30	.37	.50	.62	.75	.87	1.00	1.12	1.25	1.37
" 5 " ..... "	.37	.46	.62	.77	.93	1.08	1.25	1.40	1.56	1.71
" 6 " ..... "	.45	.55	.75	.93	1.12	1.30	1.50	1.68	1.87	2.05

Internal Diam.....inches	3	3½	4	5	6	7	8	9	10	....
Price, 2-ply.....per foot	.99	1.16	1.32	1.65	1.98	2.31	2.64	2.97	3.33	....
" 3 " ..... "	1.20	1.40	1.60	2.00	2.40	2.80	3.20	3.60	4.00	....
" 4 " ..... "	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	....
" 5 " ..... "	1.87	2.18	2.50	3.13	3.75	4.38	5.00	5.63	6.25	....
" 6 " ..... "	2.25	2.62	3.00	3.75	4.50	5.25	6.00	6.75	7.50	....

All intermediate sizes charged at the list price of the next larger size, thus: 1⅛-inch is charged at 1¼-inch price, etc. Furnished regularly in 25 and 50-foot lengths.

STEAM HOSE

Internal Diam.....inches	½	¾	1	1¼	1½	1¾	2	2¼	2½
Price, 3-ply.....per foot	.47	.57	.70	.85	1.02	1.18	1.34	1.50	1.66
" 4 " ..... "	.56	.71	.87	1.04	1.25	1.45	1.66	1.87	2.08
" 5 " ..... "	.70	.87	1.07	1.30	1.56	1.81	2.07	2.33	2.60
" 6 " ..... "	.84	1.05	1.28	1.56	1.87	2.17	2.49	2.80	3.12
" 7 " ..... "	.98	1.23	1.50	1.82	2.18	2.53	2.90	3.27	3.64
" 8 " ..... "	1.12	1.41	1.70	2.08	2.50	2.90	3.32	3.74	4.16

When ordering, state steam pressure used.

NOTE.—The list on steam hose applies to brewer's, air brake, car heating and air drill hose also.

GARDEN AND STEAM HOSE

MASSCO GARDEN HOSE

SMOOTH BRAIDED TYPE

Fig. 30774A

Braided yarn body, rubber covered and rubber lined. Massco braided construction garden hose looks better, feels better, works better, wears better and is a better buy.

Has less tendency to kink, freedom from ply separation and an advantage of greater length.

Furnished in ½, ⅝ and ¾-inch sizes in continuous lengths up to 500 feet.

Prices upon application.

MASSCO STEAM HOSE

WRAPPED DUCK TYPE

Fig. 30774B

When life depends upon the quality of the materials your men are using, it pays to buy the best.

Steam hose is put to the test both by the pressure and heat of the live steam it is carrying. If pressure alone were all that had to be met, ordinary hose of the proper weight would serve. The added factor of heat calls for special knowledge, material and construction.

Massco steam hose is intended for high pressure work and is made with the rubber lining and body to meet these conditions.

Protective coverings if desired.

Prices upon application.

STEAM AND WATER HOSE

MASSCO STEAM HOSE

WOUND WITH HALF-ROUND WIRE

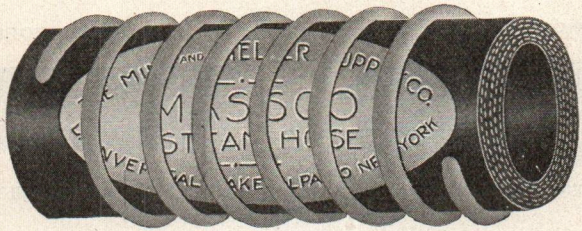


Fig. 30775A

Size Inches	Price, per Foot for Winding Water and Steam Hose — Water Hose, With Half Round or Flat Wire 3-Ply	4-Ply	5-Ply	6-Ply	Steam Hose, With Half Round or Flat Wire 3-Ply	4-Ply	5-Ply	6-Ply	Steam Hose, with Marline 3-Ply	4-Ply	5-Ply	6-Ply
½	.07	.08	.10	.12	.10	.12	.15	.18	.12	.15	.23	.23
¾	.08	.10	.12	.15	.12	.15	.19	.23	.15	.19	.29	.29
1	.10	.12	.14	.18	.14	.18	.23	.27	.18	.23	.34	.34
1¼	.12	.15	.18	.23	.18	.23	.29	.34	.23	.29	.43	.43
1½	.14	.18	.22	.28	.22	.27	.34	.41	.28	.34	.51	.51
1¾	.17	.21	.25	.32	.25	.32	.39	.47	...	...	...	...
2	.20	.24	.28	.36	.23	.36	.45	.54	.35	.45	.68	.68
2¼	.22	.27	.32	.41	.32	.41	.51	.61	.40	.51	.76	.76
2½	.24	.30	.36	.45	.36	.45	.56	.68	.45	.56	.74	.84

PRESSURES FOR WHICH STEAM HOSE IS ADAPTED

½-inch No. of Plys	½-inch Pressure Pounds	¾-inch No. of Plys	¾-inch Pressure Pounds	1-inch No. of Plys	1-inch Pressure Pounds	1¼-inch No. of Plys	1¼-inch Pressure Pounds	1½-inch No. of Plys	1½-inch Pressure Pounds	2-inch No. of Plys	2-inch Pressure Pounds
3	30	3	20	4	40	4	40	4	30	5	30
4	60	4	50	5	60	5	50	5	50	6	40
5	80	5	60	6	70	6	60	6	60	7	60
6	100	6	90	7	90	7	70	7	70	8	70
...	...	7	100	8	100	8	100	8	90	10	100
...	...	...	...	...	...	...	...	10	100	...	...

MASSCO WATER HOSE

WRAPPED DUCK TYPE

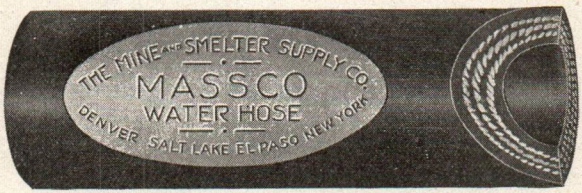


Fig. 30775B

For the thousand-and-one uses in all branches of industry where the dependable transmission of water is essential.

Reasonable in price, high in value. Sound construction and quality.

Massco Water Hose gives more real hose service than you can obtain elsewhere at the same or even greater price.

Single lengths not to exceed 50 feet.

Prices upon application.

SUCTION HOSE

MASSCO SUCTION HOSE

SMOOTH BORE

Fig. 30776A

ROUGH BORE

Fig. 30776B

Massco Suction Hose, smooth bore, is admirably adapted for all general purposes incident to contractors' work, such as pumping out foundation excavations, sewers, etc.

Massco Suction Hose, rough bore, is adapted for light service, such as transmission of water or other clear liquids. Flat galvanized iron or tinned steel wire brought flush with the rubber lining forms the basis of the hose wall.

SMOOTH BORE				ROUGH BORE			
Internal Diam. Inches	Price per Foot	Internal Diam. Inches	Price per Foot	Internal Diam. Inches	Price per Foot	Internal Diam. Inches	Price per Foot
2	2.60	6	10.50	¾	.70	5	7.60
2½	3.50	6½	12.00	1	.90	5½	8.50
3	4.50	7	13.50	1¼	1.15	6	9.50
3½	5.50	7½	15.00	1½	1.50	6½	10.50
4	6.50	8	16.50	1¾	1.90	7	12.00
4½	7.50	9	19.50	2	2.30	7½	13.50
5	8.50	10	22.50	2½	3.10	8	15.00
5½	9.50	12	27.50	3	4.00	9	17.50
...	....	..	.....	3½	4.90	10	20.00
...	....	..	.....	4	5.80	12	25.00
...	....	.. ....	.....	4½	6.70	..	.....

CONTRACTORS' SPECIAL ROUGH BORE SUCTION HOSE

Thoroughly dependable but adapted to somewhat lighter service than Massco. Prices upon application.

MASSCO HARD RUBBER SUCTION HOSE

For very light suction purposes. Not made in sizes more than 1½-inches internal diameter.

Prices upon application.

MASSCO WATER HOSE

BRAIDED TYPE

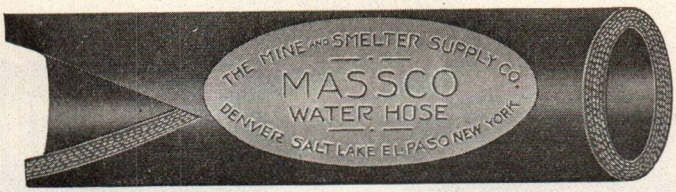


Fig. 30777A

Massco for use where external wear is harder; where falling rocks and chunks of ore are frequent; where armoured hose is objectionable, where long life is desired.

CONSTRUCTION.—Extra thick rubber cover of unusual wear-resisting properties, strong fabric body, live elastic friction rubber, heavy inner tube of special oil-resisting compounds.

FEATURES.—Resists abrasion to the utmost, no protective coverings necessary, not permanently distorted by falling rocks, blows, etc., but recovers immediately; extreme flexibility, easily handled, long life of satisfactory service.

Continuous lengths up to 500 feet.

WRAPPED TYPE, 50-FOOT LENGTHS

Internal Diam. Inches	Price, per Foot				
	2-ply	3-ply	4-ply	5-ply	6-ply
½	.20	.25	.30	.37	.45
¾	.25	.30	.37	.46	.55
1	.33	.40	.50	.62	.75
1¼	.42	.50	.62	.77	.93
1½	.50	.60	.75	.93	1.12
1¾	.58	.70	.87	1.08	1.30
2	.66	.80	1.00	1.25	1.50
2¼	.75	.90	1.12	1.40	1.68
2½	.83	1.00	1.25	1.56	1.87
2¾	.92	1.10	1.37	1.71	2.05
3	.99	1.20	1.50	1.87	2.25

BRAIDED TYPE, 500-FOOT LENGTHS

Internal Diam. Inches	Price, per Foot	
	2 Braid	3 Braid
*1	...	.50
1¼	.50	.62
1½	.60	.75

*1-inch—2 braid, net price per foot quoted upon application.

AIR DRILL AND PNEUMATIC HOSE

MASSCO AIR DRILL HOSE

WRAPPED DUCK TYPE

PLAIN

Fig. 30778A

WIRE WRAPPED

Fig. 30778B

Massco strong, sturdy construction with a ply of canvas over the outer rubber cover. The wrapped duck type consists of a heavy rubber inner tube, husky fabric body and an outer rubber cover, plus the added protection of a ply of frictioned fabric. Can also be furnished with extra protective covering if desired.

Although especially suited for stone quarry work, it gives perfect satisfaction for any drill service where there is unusual wear and tear.

Inside Diameter.....inches	½	¾	1	1¼	1⅜	1½
Price, 2 and 3-ply Inside, 1-ply Outside....per ft.	.47	.57	.70	.85	.94	1.02
" 3 " 4 " " 1 " " ... "	.56	.71	.87	1.04	1.15	1.25
" 4 " 5 " " 1 " " ... "	.70	.87	1.07	1.30	1.43	1.56
" 5 " 6 " " 1 " " ... "	.84	1.05	1.28	1.56	1.71	1.87
" 6 " 7 " " 1 " " ... "	.88	1.23	1.50	1.82	2.00	2.18
" 7 " 8 " " 1 " " ... "	1.12	1.41	1.70	2.08	2.29	2.50

Inside Diameter.....inches	1⅝	1¾	2	2¼	2½	....
Price, 2 and 3-ply Inside, 1-ply Outside...per ft.	1.10	1.18	1.34	1.50	1.66	....
" 3 " 4 " " 1 " " ... "	1.35	1.45	1.66	1.87	2.08	....
" 4 " 5 " " 1 " " ... "	1.69	1.81	2.07	2.33	2.60	....
" 5 " 6 " " 1 " " ... "	2.02	2.17	2.49	2.80	3.12	....
" 6 " 7 " " 1 " " ... "	2.35	2.53	2.90	3.27	3.64	....
" 7 " 8 " " 1 " " ... "	2.70	2.90	3.32	3.74	4.16	....

MASSCO PNEUMATIC HOSE

WRAPPED TYPE

Fig. 30778C

An extremely high quality, quite beyond the average.

Special light weight duck. Two plies placed on outside to better withstand external wear. Good quality tube. An exceptional value for all general requirements.

Single lengths not to exceed 50 feet.

Prices upon application.

MILL HOSE

MASSCO MILL HOSE

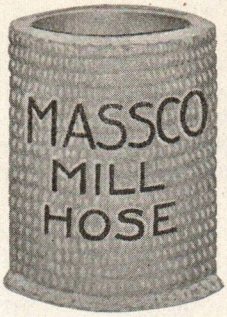


Fig. 30779A

COTTON RUBBER LINED MILL HOSE

Internal Diameter.....inches	1	1¼	1½	2	2½
Price.....per foot	.40	.45	.50	.65	.80

MASSCO SINGLE JACKET

Exceptionally high quality that can be safely recommended for all general service. A finely woven single cotton jacket provides ample protection against hard wear.

UNDERWRITERS' MILL FIRE HOSE

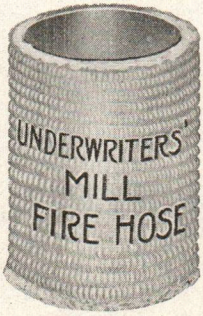


Fig. 30779B

It conforms with the specifications of the Associated Factory Mutual Fire Insurance Companies and the National Board of Fire Underwriters' or Underwriters' Laboratories, Inc., and can be furnished with the label of the latter concerns when desired. Has life-giving elements far beyond the requirements of these specifications.

NOTE—All cotton rubber lined hose should be wound on reels, not folded. The latter method is harmful to rubber lining and may result in shortening life of hose.

Prices upon application.

STEAM HOSE

Appended tables show the varying degrees of heat under different pressures and the number of plies to be ordered to withstand the several degrees of pressure and heat.

It must be remembered that in high degrees of heat the best qualities must be ordered as rubber is vulcanized at a temperature of about 240 degrees and when subjected to continuous heat greater than 240 degrees hose will harden and deteriorate.

The strain on hose increases with the diameter. Tests show that one-inch hose will stand about twice the pressure of two inch of the same number of plies.

For special work send full information when ordering.

Steam Gauge	Heat	Steam Gauge	Heat	Steam Gauge	Heat
0	212	30	274	80	324
1	216	35	281	85	328
2	219	40	287	90	331
3	222	45	292	95	334
4	225	50	298	100	338
5	228	55	303	105	341
10	240	60	307	110	344
15	250	65	312	115	347
20	259	70	316	120	350
25	267	75	320	125	353

NUMBER OF PLIES TO ORDER IN STEAM HOSE, SIZE OF HOSE AND STEAM PRESSURE BEING GIVEN

20 Pounds Pressure

Order 4-ply for ½-inch
" 4 " " ¾ "
" 4 " " 1 "
" 4 " " 1¼ "
" 4 " " 1½ "
" 4 " " 2 "

30 Pounds Pressure

Order 4-ply for ½-inch
" 4 " " ¾ "
" 4 " " 1 "
" 4 " " 1¼ "
" 4 " " 1½ "
" 5 " " 2 "

40 Pounds Pressure

Order 4-ply for ½-inch
" 4 " " ¾ "
" 4 " " 1 "
" 4 " " 1¼ "
" 5 " " 1½ "
" 6 " " 2 "

50 Pounds Pressure

Order 4-ply for ½-inch
" 4 " " ¾ "
" 5 " " 1 "
" 5 " " 1¼ "
" 5 " " 1½ "
" 8 " " 2 "

60 Pounds Pressure

Order 4-ply for ½-inch
" 5 " " ¾ "
" 6 " " 1 "
" 6 " " 1¼ "
" 6 " " 1½ "
" 8 " " 2 "

70 Pounds Pressure

Order 5-ply for ½-inch
" 6 " " ¾ "
" 7 " " 1 "
" 7 " " 1¼ "
" 8 " " 1½ "
" 10 " " 2 "

80 Pounds Pressure

Order 6-ply for ½-inch
" 6 " " ¾ "
" 8 " " 1 "
" 8 " " 1¼ "
" 9 " " 1½ "
" 10 " " 2 "

90 Pounds Pressure

Order 6-ply for ½-inch
" 6 " " ¾ "
" 8 " " 1 "
" 9 " " 1¼ "
" 10 " " 1½ "

100 Pounds Pressure

Order 8-ply for ½-inch
" 8 " " ¾ "
" 10 " " 1 "
" 10 " " 1¼ "
" 10 " " 1½ "

SUCTION HOSE AND HOSE WINDING

SUCTION HOSE

SMOOTH BORE

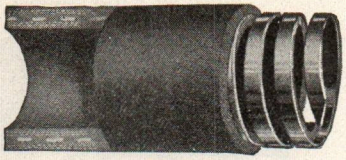


Fig. 950A

WIRE LINED

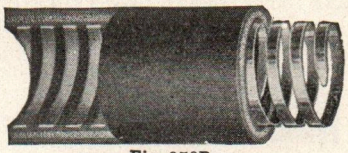


Fig. 950B

Size ..... inches	¾	1	1¼	1½	1¾	2	2½
Price, Smooth Bore ..... per foot	.80	1.05	1.30	1.70	2.15	2.60	3.50
" Wire Lined ..... "	.70	.90	1.15	1.50	1.90	2.30	3.10
" Brass Wire Lined ..... "	.77	1.00	1.25	1.65	2.10	2.50	....
" Agricultural ..... "	.65	.75	.93	1.13	1.31	1.50	1.88
" Hard Rubber ..... "	.65	.75	.93	1.13	....	....	....

Size ..... inches	3	3½	4	4½	5	5½	6
Price, Smooth Bore ..... per foot	4.50	5.50	6.50	7.50	8.50	9.50	10.50
" Wire Lined ..... "	4.00	4.90	5.80	6.70	7.60	8.50	9.50

Size ..... inches	6½	7	7½	8	9	10	12
Price, Smooth Bore ..... per foot	12.00	13.50	15.00	16.50	19.50	22.50	27.50
" Wire Lined ..... "	10.50	12.00	13.50	15.00	17.50	20.00	25.00

WINDING WATER HOSE* WITH ROUND, HALF-ROUND AND FLAT WIRE; FLAT AND ROUND WIRE BRAID

COVERING STEAM AND AIR DRILL HOSE WITH WOVEN COTTON (PLAIN OR PAINTED) AND MARLINE JACKETS

Size Inches	Price, per Foot				Price, per Foot					
	3-ply	4-ply	5-ply	6-ply	3-ply	4-ply	5-ply	6-ply	7-ply	8-ply
½	.07	.08	.10	.12	.12	.15	.19	.23	.26	.30
¾	.08	.10	.12	.15	.15	.19	.24	.29	.33	.38
1	.10	.12	.15	.18	.18	.23	.29	.34	.40	.46
1¼	.12	.15	.19	.23	.23	.29	.36	.43	.51	.58
1½	.14	.18	.23	.27	.28	.34	.46	.51	.60	.68
1¾	.17	.21	.26	.32	...	...	...	...	...	....
2	.20	.24	.30	.36	.35	.45	.56	.68	.79	.92
2¼	.22	.27	.34	.41	.40	.51	.64	.76	.89	1.02
2½	.24	.30	.38	.45	.45	.56	.70	.84	.98	1.12
3	.28	.36	.46	.54	...	...	...	...	...	....

*Of wrapped duck or combination of wrapped duck and braided construction.

WINDING STEAM AND AIR HOSE WITH ROUND, HALF-ROUND AND FLAT WIRE; MARLINE; FLAT AND ROUND WIRE BRAID

Size Inches	Price, per Foot					
	3-ply	4-ply	5-ply	6-ply	7-ply	8-ply
½	.10	.12	.15	.18	.21	.24
¾	.12	.15	.19	.23	.26	.30
1	.14	.18	.23	.27	.32	.36
1¼	.18	.23	.29	.34	.40	.45
1½	.22	.27	.34	.41	.47	.54
1¾	.25	.32	.39	.47	.55	.63
2	.28	.36	.45	.54	.63	.72
2¼	.32	.41	.51	.61	.71	.81
2½	.36	.45	.56	.68	.79	.90

WINDING PNEUMATIC TOOL HOSE WITH ROUND, HALF-ROUND AND FLAT WIRE; FLAT AND ROUND WIRE BRAID

Size Inches	Price, per Foot				
	3-ply	4-ply	5-ply	6-ply	7-ply
¼	.09	.11	.13	...	...
⅜	.09	.11	.13	.16	...
½	.10	.12	.15	.18	.21
⅝	.11	.14	.17	.20	.24
¾	.12	.15	.19	.23	.26
1	.14	.18	.23	.27	.32
1¼	.18	.23	.29	.34	.40
...	...	...	...	...	...
...	...	...	...	...	...

AMERICAN METAL HOSE

FOR STEAM, OIL, GAS, SUCTION, AIR OR CONDUIT

BD 15
BARE INTERLOCKED CONSTRUCTION

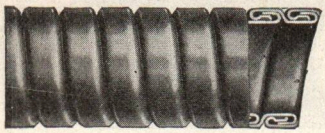


Fig. 2059A

BD 20
BRAIDED WIRE JACKET

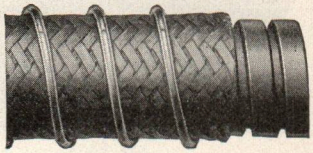


Fig. 2059B

BD 15 BRONZE

A hose made of metal. Steam cannot burn it; oil will not rot it.

Steel hose of the BD Types is adapted to the carrying of oils, fats, greases, etc., also ammonia and super-heated steam. On account of its tendency to rust, it is not recommended for saturated steam except under exceptional circumstances.

BD Bronze 15 is suitable for all-around steam purposes, particularly in sizes larger than ¾-inch.

Inside Diameter...in.	3/16	¼	5/16	⅜	½	¾	1	1¼	1½	2	2½	3	4
Price, Steel...per foot	.10	.12	.18	.25	.35	.60	.75	1.00	1.25	1.70	2.20	2.70	3.30
" Bronze. "	.13	.18	.30	.55	.80	1.25	1.60	2.25	2.70	3.90	4.50	6.50	7.50

BD 20 BRONZE

BD 20 should be used for unusually high pressure work, or where hose is subjected to considerable handling and dragging about.

BD 20 is the bare hose covered with a close braiding of bronze or steel wires and wound with a spiral steel armor wire. This wire jacket does not affect to any appreciable extent either the weight or the flexibility of the hose, but adds materially to its strength and makes it suitable for services where rough handling and high pressures are involved. Recommended for blowing boiler tubes and other similar duties; also where short lengths are used as steam connections on presses, and in other duties where it is subjected to frequent and regular bending.

Inside Diameter.....inches	3/16	¼	5/16	⅜	½	¾	1	1¼	1½	2	2½
Price, Steel, Steel Braided .....per foot	.20	.25	.33	.45	.55	.85	1.05	1.35	1.80	2.30	2.90
Price, Bronze, Steel Braided .....per foot	.23	.31	.45	.75	1.00	1.50	1.90	2.60	3.25	4.50	5.30
Price, Bronze, Bronze Braided .....per foot	.27	.35	.50	.85	1.20	1.75	2.30	3.15	3.90	5.15	6.30

IMPORTANT.— In ordering American Metal Hose, always specify: length, size (internal diameter) and style wanted. Style (packed or soldered) and size pipe thread of couplings. Nature of service, including maximum pressure which hose will have to carry.

COUPLINGS

SOLDERED COUPLINGS

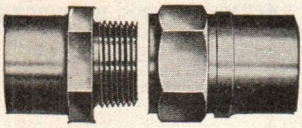


Fig. 2059C

PACKED COUPLINGS FOR STEAM HOSE

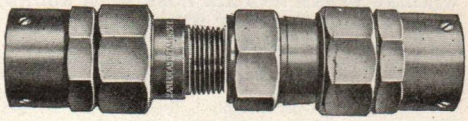


Fig. 2059D

Size.....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	4
Price, Soldered..per set	.60	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00	10.00	12.00
" Packed... "	2.00	2.50	3.00	4.00	5.00	6.00	7.00	9.00	12.00	15.00	25.00

All couplings, unless otherwise specified, have standard iron pipe threads corresponding to the internal diameter of the hose to which they are attached.

Soldered couplings are sweated on and should never be used on steam hose or in any service where there is sufficient heat to soften solder. Couplings for steam hose are packed on with asbestos and red lead and will stand heavy pressure and high heat.

MULCONROY HIGH PRESSURE COUPLINGS

THE COUPLING THAT NEVER BLOWS OFF

FEMALE

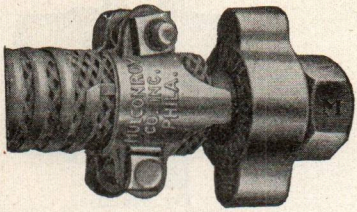


Fig. 13300A

All parts made heavy and will stand lots of abuse and hard wear.

The stem is smooth and tapered and will not injure or distort tube of hose.

For Hose Size .....inches	½	¾	1	1¼	1½	2	2½
Price, Complete .....each	1.20	2.00	2.00	3.20	3.90	5.00	11.00

PARTS FOR FEMALE COUPLINGS

CLAMPS

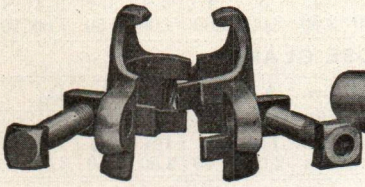


Fig. 13300B

STEM

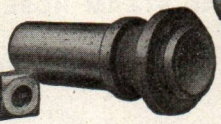


Fig. 13300C

NUT

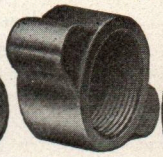


Fig. 13300D

SPUD

Fig. 13300E

A channelled lip on stem prevents loss of washer. An exclusive feature.

For Couplings, Size.....inches	½	¾	1	1¼	1½	2	2½
Price, Clamps.....each	.40	.40	.40	.58	.80	1.20	3.00
" Stems ..... "	.40	.50	.50	.78	1.20	1.40	3.00
" Nuts ..... "	.25	.70	.70	1.30	2.20	2.20	3.50
" Spuds ..... "	.20	.50	.50	.60	1.20	1.40	3.00

MALE

Mulconroy Male Couplings are particularly adapted for all kinds of pneumatic hose. They are compact, neat, easily attached, will not injure tube or cover of hose, and never blow off.

The higher efficiency, due to large volume and saving of the hose, will many times save the small cost of the couplings.

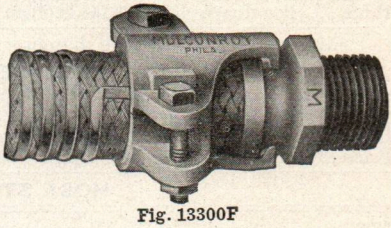


Fig. 13300F

For Hose, Size.....inches	⅜	½	¾	1	1¼	1½	2
Price.....each	.75	1.00	1.00	1.00	1.25	1.50	2.00

In ordering, state size of thread desired. ½-inch males are made with ¼, ⅜ and ½-inch thread, ¾-inch males are made with ⅜, ½ and ¾-inch thread. When no size thread is given we furnish ⅜-inch thread with ½-inch males and ½-inch thread with ¾-inch males. On larger sizes, the size of the thread is the same as the size of the hose.

HOSE BANDS AND COUPLINGS

SHERMAN HOSE CLAMP

Fig. 8291A

CALDWELL STRAP

Fig. 8291B

STRAP FASTENER

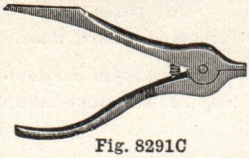


Fig. 8291C

EXPANSION RING COUPLING

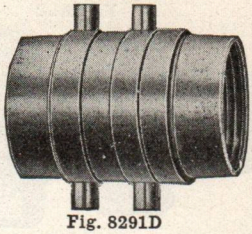


Fig. 8291D

SHERMAN WATER HOSE CLAMPS

Size ....inches	1/4	3/8	3/8	1/2	1/2	1/2	3/4	3/4	3/4	1
Hose ....ply	3	2	3	2	3	4	2	3	4	2
Price ....per dozen	.60	.60	.60	.60	.60	.60	.60	.60	.60	2.00

Size ....inches	1	1	1 1/4	1 1/4	1 1/2	1 1/2	2	2 1/4	2 1/2	3
Hose ....ply	3	4	3	4	3	4	3–4	3–4	3–4	3–4
Price ....per dozen	2.00	2.00	2.50	2.50	3.00	3.00	4.00	6.50	7.00	10.00

SHERMAN STEAM HOSE CLAMPS

Size ....inches	3/4	3/4	1	1	1 1/4	1 1/4
Hose ....ply	3	4	3	4	3	4
Inside Diameter....inches	1 7/16	1 17/32	1 5/8	1 21/32	1 15/16	1 31/32
Price ....per dozen	2.00	2.00	2.50	2.50	3.00	3.00

Size ....inches	1 1/2	1 1/2	2	2	2 1/2	2 1/2
Hose ....ply	3–4	5	3–4	5	3–4	5
Inside Diameter....inches	2 7/32	2 13/32	2 11/16	2 7/8	3 1/4	3 9/16
Price ....per dozen	3.50	4.00	5.50	6.50	8.50	9.50

DOUBLE BOLT CLAMPS

*Size ....inches	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6	6 1/4	6 1/2	6 3/4	7
Price ....per dozen	11.25	13.75	15.25	16.75	18.25	19.75	21.25	22.75	24.25	26.00	28.00	30.00	32.00

*Size ....inches	7 1/4	7 1/2	7 3/4	8	8 1/4	8 1/2	8 3/4	9	9 1/4	9 1/2	9 3/4	10	....
Price ....per dozen	34.00	36.00	38.00	40.00	42.00	44.00	46.00	48.00	50.00	52.00	54.00	56.00	....

*Measurements of inside diameter.

CALDWELL HOSE STRAPS

Hose ....inches	1/2	1/2	3/4	3/4	1	1	1 1/4	1 1/4	1 1/2	1 1/2
Length ....inches	3 3/8	3 3/4	4 1/8	4 1/2	5	5 3/8	6	6 3/8	6 3/4	7 1/8
Price ....per dozen	.40	.40	.60	.60	.80	.80	1.00	1.00	1.20	1.20

HOSE STRAP FASTENERS

Size ....inches	1/2 to 1	1 1/4 to 1 1/2
Price....each	.50	.75

EXPANSION RING COUPLINGS

In order to avoid mistakes in ordering, give exact outside diameter of hose. It is always better to send sample of hose when possible. Made in five sizes: 1, 1 1/4, 1 1/2, 2, and 2 1/2-inch. We furnish free with each set, two expansion rings and a rubber washer Prices on application.

HOSE FITTINGS

BUSHING

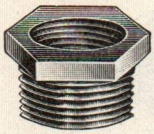


Fig. 4905A

REDUCER

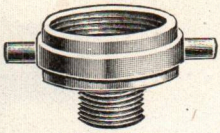


Fig. 4905B

MALE NIPPLE

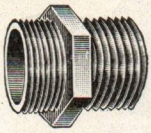


Fig. 4905C

MALE AND FEMALE NIPPLE

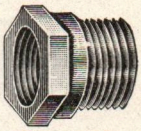


Fig. 4905D

HOSE BUSHINGS AND REDUCERS

Size.....inches	1x½	1x¾	1¼x¾	1¼x1	1½x¾	1½x1	1½x1¼	2x¾	2x1
Price..per doz.	5.50	6.50	8.00	10.00	11.50	11.50	12.00	13.00	14.00
Size.....inches	2x1¼	2x1½	2½x¾	2½x1	2½x1¼	2½x1½	2½x2	3x2	3x2½
Price..per doz.	16.00	18.00	20.00	22.00	23.00	24.00	26.00	30.00	36.00

MALE OR MALE AND FEMALE HOSE NIPPLES

Size.....inches	½	¾	1	1¼	1½	2	2½	3	3½	4
Price.....per doz.	3.50	3.50	5.00	9.00	10.00	14.00	28.00	40.00	50.00	75.00

In ordering any of the above goods, specify whether hose or iron pipe thread is required.

SIAMESE CONNECTIONS

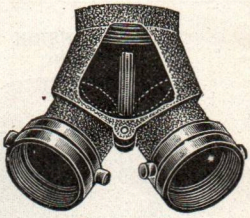


Fig. 4905E

Size, Iron Pipe.....inches	3	4
Size, Both Nozzles.....inches	2½	2½
Price.....each	15.00	18.00

These connections are threaded Chicago Fire Department standard. We can furnish any thread desired on receipt of sample.

HOSE SPANNERS—MALLEABLE IRON

Fig. 4905F

Size.....inches	1¼	1½	2	2½
Price.....each	.12	.15	.20	.25

HOSE COUPLINGS, ETC.

HOSE COUPLINGS

GARDEN, ½, ¾ AND 1-INCH

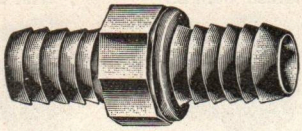


Fig. 4882A

REGULAR

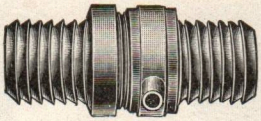


Fig. 4882B

Size ..... inches	½	⅝	¾	1	1¼	1½	2
Price, Hose Thread ..... per dozen	2.40	2.40	2.40	4.40	10.00	14.00	24.00
" Pipe " ..... "	2.65	2.65	2.65	4.65	10.50	15.00	26.00
Size ..... inches	2½	3	3½	4	5	6	8
Price, Hose Thread ..... per dozen	48.00	75.00	.....	.....	.....	.....	.....
" Pipe " ..... "	50.00	76.00	120.00	150.00	250.00	500.00	600.00

STEAM HOSE COUPLINGS

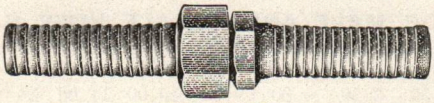


Fig. 4882C

Size ..... inches	½	¾	1	1¼	1½	2	2½
Price, Hose Thread ..... per dozen	15.00	15.00	18.00	24.00	30.00	42.00	72.00
" Iron Pipe Thread ..... "	15.00	15.00	18.00	24.00	30.00	42.00	72.00
" Female Half-Hose or I. P. Thread "	10.00	10.00	12.00	16.00	20.00	28.00	48.00

MARINE EXPANSION RING COUPLING

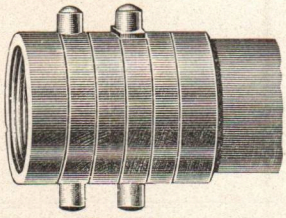


Fig. 4882D

EXPANSION RING

Fig. 4882E

IMPROVED PERFECT HOSE MENDER

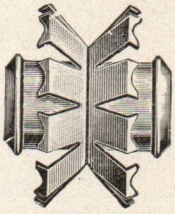


Fig. 4882F

MARINE EXPANSION RING COUPLINGS

Size ..... inches	1¼	1½	2	2½
Price ..... each	1.70	2.00	2.40	2.80

In ordering, state kind of hose to be used on and style of thread desired.

EXPANSION RINGS

Size ..... inches	1¼	1½	2	2½
Price ..... per dozen	1.25	1.40	1.60	1.80

Furnished also in larger sizes. Prices on application.

IMPROVED PERFECT CLINCHING HOSE MENDERS

Size ..... inches	½	⅝	¾
Price ..... per dozen	.80	.80	.80

HOSE PIPES, ETC.

HOSE PIPES

UNDERWRITERS'

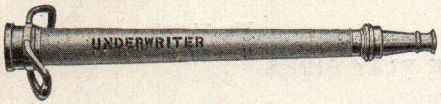


Fig 7089A

SCREW TIP

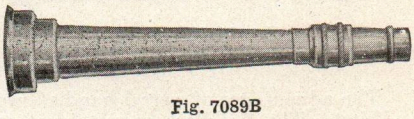


Fig. 7089B

UNDERWRITERS' AND SWIVEL HANDLE

Size	inches	1½	2	2½	2½	2½
Length	"	19	20	24	30	36
Price, Wound and Painted	each	**8.00**	**9.00**	**11.00**	**12.00**	**15.00**
" Plain Brass	"	**7.00**	**7.50**	**9.50**	**11.00**	**13.50**
" Rubber Tube, Swivel Handles	"	....	....	....	**15.00**	**18.00**
" Leather " " "	"	....	....	....	.....	**18.00**

SCREW TIP—HOSE OR PIPE THREAD

Size	inches	¾	¾	¾	1	1	1¼	1¼	1½	1½
Length	"	6	7½	12	8½	12½	12	15	12	13
Price	per doz.	**7.00**	**8.00**	**10.00**	**10.00**	**12.00**	**20.00**	**24.00**	**24.00**	**25.00**
Size	inches	1½	1½	2	2	2	2½	2½	2½	2½
Length	"	15	19	12	15	20	15	20	24	30
Price	per doz.	**30.00**	**40.00**	**38.00**	**45.00**	**50.00**	**75.00**	**96.00**	**100.00**	**144.00**

PLAIN

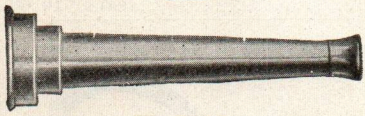


Fig. 7089C

WITH COCK

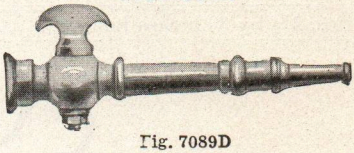


Fig. 7089D

PLAIN—HOSE OR PIPE THREAD

Size	inches	¾	¾	¾	1	⅛	1¼	1¼	1½
Length	"	3	8	8	4		4¾	10	5¾
Price	per dozen	**4.00**	**7.00**	**8.00**	**5.00**	**9.50**	**12.00**	**15.00**	**18.00**
Size	inches	1½	2	2	2½	2½	2½	2½	2½
Length	"	12	6¾	12	7½	12	15	22	18
Price	per dozen	**22.00**	**26.00**	**34.00**	**37.40**	**55.00**	**65.00**	**92.00**	**80.00**

WITH COCK—HOSE OR PIPE THREAD

Size	inches	¾	¾	¾	1	1	1¼	1¼	1½	1½
Length	"	6	8	12	8	12	12	15	12	15
Price	per doz.	**11.00**	**13.00**	**18.00**	**15.00**	**20.00**	**40.00**	**50.00**	**55.00**	**65.00**
Size	inches	2	2	2½	2½	2½	2½	2½	2½	2½
Length	"	12	20	25	12	15	20	24	30	36
Price	per doz.	**80.00**	**110.00**	**130.00**	**145.00**	**155.00**	**160.00**	**175.00**	**195.00**	**215.00**

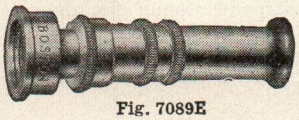


Fig. 7089E

GARDEN HOSE NOZZLES

Size	inches	¾	1
Price	per dozen	....	....

FIRE DEPARTMENT SUPPLIES

SWIVEL HANDLE PLAY PIPE

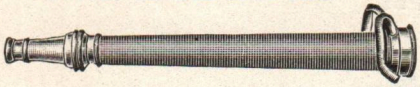


Fig. 14389A

UNDERWRITERS' PLAY PIPE

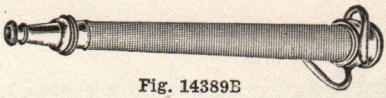


Fig. 14389B

SWIVEL HANDLE PLAY PIPES

The advantages of swivel handled pipes are:

First. The handles are placed in such shape as to conform to the position of the pipeman without cramping the hand or arm into an unnatural position.

Second. It often happens that the hose turns two or three times over when the water is forced through it. If the handle did not swivel so as to allow the pipe to rotate, it would wrench it from the pipeman and subject him to danger and the pipe to harm.

Size ..... inches	2	2½	2½	2½
Length ..... inches	20	24	30	36
Price, Wound and Painted ..... each	9.00	11.00	12.00	15.00
" Plain Brass ..... "	7.50	9.50	11.00	13.50
" Rubber Tube, Swivel Handles ..... "	....	.....	15.00	18.00
" Leather " " " ..... "	....	.....	.....	18.00

UNDERWRITERS' PLAY PIPES

We can furnish swivel handle play pipes according to the specifications of the Associated Factory Mutual Fire Insurance Co. of Boston, and are prepared to quote on these goods on application. These pipes are made in strict accordance with the specifications of the above company in all respects.

Price, 2½ by 30 inches Long ..... each	10.00

FLEXIBLE TUBE PLAY PIPE

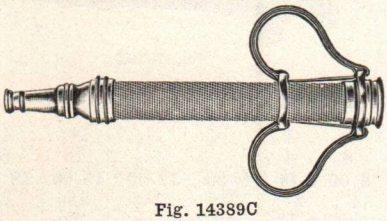


Fig. 14389C

SHORT FIRE DEPARTMENT PIPE

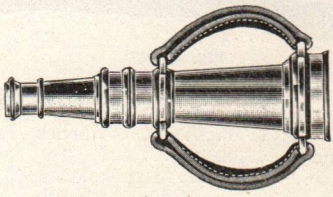


Fig. 14389D

FLEXIBLE TUBE PLAY PIPES

The tube in this pipe is made with wire inserted rubber and can be bent, if desired. In some places in fire department work this is a necessity.

Price, 2½ by 30 inches Long ..... each	24.00

SHORT FIRE DEPARTMENT PIPES

We aim to have our offering of fire department pipes as complete as possible and the above shows one of the new additions to our list. It is made with long loop handles and screw tip and there seems to be an increasing demand among fire department chiefs for this style of pipe.

Price, 2½ by 12 inches Long ..... each	20.00

Made in 2½-inch size only.

BOWES HOSE RACKS

STYLE E

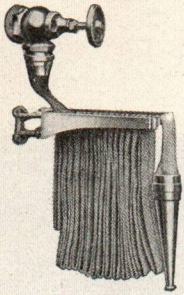


Fig. 3679A

STYLE F

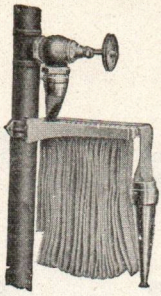


Fig. 3679B

STYLE G

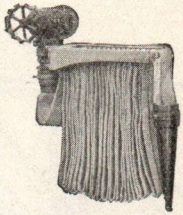


Fig. 3679C

IRON

Number Style E	Number Style F	Number Style G	Capacity Unlined Linen Hose	Price, Each Red Enamel Finish	Price, Each Nickel-plated
31	41	51	50 feet, 1½-inch	5.00	7.00
32	42	52	50 " 2 "	5.00	7.00
33	43	53	50 " 2½ "	5.00	7.00
31A	41A	51A	75 " 1½ "	5.00	7.00
32A	42A	52A	75 " 2 "	5.00	7.00
33A	43A	53A	75 " 2½ "	5.00	7.00
34	44	54	100 " 1½ "	6.00	8.00
35	45	55	100 " 2 "	6.00	8.00
36	46	56	100 " 2½ "	6.00	8.00
34A	44A	54A	150 " 1½ "	6.00	8.00
35A	45A	55A	150 " 2 "	6.00	8.00
36A	46A	56A	150 " 2½ "	6.00	8.00

Furnished finished in aluminum or gold bronze or dead black without extra charge.

SOLID BRASS

Number Style E	Number Style F	Number Style G	Capacity Unlined Linen Hose	Price, Each Red Enamel Finish	Price, Each Nickel-plated
131	141	151	50 feet, 1½-inch	10.00	11.00
132	142	152	50 " 2 "	10.00	11.00
133	143	153	50 " 2½ "	10.00	11.00
131A	141A	151A	75 " 1½ "	10.00	11.00
132A	142A	152A	75 " 2 "	10.00	11.00
133A	143A	153A	75 " 2½ "	10.00	11.00
134	144	154	100 " 1½ "	12.00	13.00
135	145	155	100 " 2 "	12.00	13.00
136	146	156	100 " 2½ "	12.00	13.00
134A	144A	154A	150 " 1½ "	12.00	13.00
135A	145A	155A	150 " 2 "	12.00	13.00
139A	146A	156A	150 " 2½ "	12.00	13.00

In ordering F racks specify size of pipe clamp. List prices include pipe clamps up to 4-inch. For larger sizes—iron, 5-inch, .30; 6-inch, .35; brass, 5-inch, .60; 6-inch, .75 each, net.

Style G is attached by a pipe clamp to a nipple screwed into the valve. No charge made for nipple with iron pipe thread, but special thread nipple will be extra.

SWINGING HOSE RACKS

DEWEY

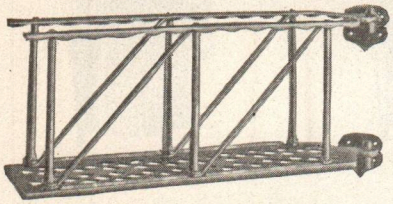


Fig. 6805A

HARTFORD

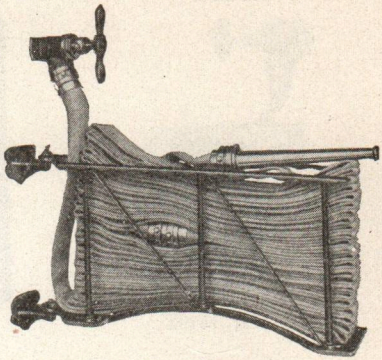


Fig. 6805B

The Dewey Rack is especially recommended for warehouses and manufacturing plants. The hose is folded flat, and as the rack is usually suspended about six feet from the floor, the hose is protected from damage and yet is instantly available in case of emergency. It is approved by the Associated Factory Mutual Insurance Companies.

The Hartford Rack is similar to the Dewey Rack, but it is made with an arched bedplate. The advantage of this is that the hose lies better on a rack with an arched bottom, as the arch supports the weight of the hose and relieves the folded ends of any pressure. The top of the hose so folded will be level and not concave.

The underwriters approve a hose rack with an arched bedplate, and the Hartford Rack is largely specified by architects and owners on account of the advantages above mentioned.

Dewey Racks Number	Hartford Racks Number	Size Hose Inches	Capacity Feet	Kind of Hose	Price Each
7	17	1 or 1¼	50	Unlined Linen	5.00
8	18	1½	50	" "	5.00
9	19	2	50	" "	5.00
10	20	2½	50	" "	5.00
7A	17A	1 or 1¼	75	" "	5.50
8A	18A	1½	75	" "	5.50
9A	19A	2	75	" "	5.50
10A	20A	2½	75	" "	5.50
10B	21A	1 or 1¼	100	" "	6.00
11	21	1½ or 2	100	" "	6.00
12	22	2½	100	" "	6.00
13	23	1½ or 2	150	" "	7.00
14	24	2½	150	" "	7.00
13	23	1½ or 2	50	Rubber Lined Cotton Mill	7.00
14	24	2½	50	" " " "	7.00
15	25	1½ or 2	100	" " " "	7.50
16	26	2½	100	" " " "	8.00

Both the Dewey and the Hartford Racks are packed knocked down in individual wooden boxes for convenience. Stock finish is red enamel, baked on. Nos. 15, 16, 25 and 26 will carry heavy rubber-lined cotton hose in 50-foot lengths.

Both the Dewey and the Hartford Racks are furnished with pipe clamps or wall brackets. In ordering, state which attachment is desired, and if pipe clamps, give the size of the standpipe.

HOSE REELS

STYLE D WAREHOUSE REEL

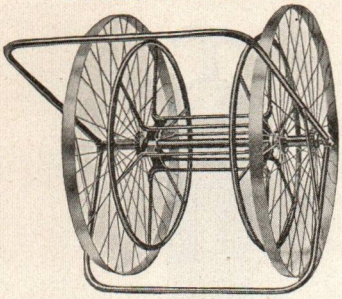


Fig. 24305A

STYLES E AND F WAREHOUSE REELS

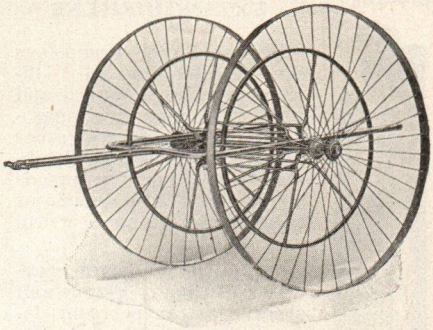


Fig. 24305B

STYLE D WAREHOUSE REELS

This is a good, strong, compact, serviceable reel. Has tubular steel reel, frame and steel wheels. Especially adapted for mills, factories, warehouses, etc.

Number of Reel	41	51	61
Height of Wheels ... inches	42	48	52
Extreme Width Over All ... "	38	46	52
Weight of Reel, bundled for shipping ... pounds	150	185	200
Capacity, 1½-inch 4-ply Rubber Hose ... feet	250	400	500
" 2 " 4 " " " ... "	200	300	400
" 2½ " 4 " " " ... "	150	250	300
" 1½ " Cotton Rubber-lined Hose ... "	500	650	800
" 2 " " " " " ... "	350	500	600
" 2½ " " " " " ... "	250	400	500
Price ... each	**35.00**	**45.00**	**55.00**

STYLES E AND F WAREHOUSE REELS

For mills, railroads, factories and warehouses. Equipped with tubular steel frame, reel and steel wheels. Neatly finished in vermilion and black.

Style	E			F		
Number of Reel	90	100	110	101	102	103
Height of Wheels ... inches	36	36	38	42	48	52
Extreme Outside Width ... "	31	33	38	42	48	54
Weight Complete, bundled for shipping ... pounds	75	90	100	145	175	200
Capacity, ¾-inch 3-ply Rubber Hose ... feet	500	600	800	...	...	...
" 1 " 4 " " " ... "	200	300	400	...	...	...
" 1¼ " 4 " " " ... "	150	200	300	...	...	...
" 1½ " 4 " " " ... "	100	150	200	250	400	500
" 2 " 4 " " " ... "	...	...	...	200	300	400
" 2½ " 4 " " " ... "	...	...	...	150	250	300
" 1¼ " Cotton Rubber-lined Hose ... "	300	400	500	...	...	...
" 1½ " " " " " " "	200	300	400	500	650	800
" 2 " " " " " " "	150	200	250	350	500	600
" 2½ " " " " " " "	100	150	200	250	400	500
Price ... each	**12.00**	**17.00**	**25.00**	**35.00**	**45.00**	**55.00**

Special sizes to order.

FIRE EXTINGUISHERS

WITH BRACKETS

PYRENE FIRE EXTINGUISHERS

Pyrene Fire Extinguishers are the safest and most efficient type for electrical and all fires starting in oil, gasoline, shellac, paints or other highly inflammable substances. Water only spreads oil fires and it is dangerous to use water on an electrical fire.

Insurance companies recognize the value of Pyrene and grant a fifteen per cent deduction in automobile fire insurance when cars are equipped with Pyrene. The law requires and safety demands that motor boats carry fire extinguishers.

Employees need no instruction to use Pyrene. It is efficient in the hands of a woman or a ten year old boy.

Pyrene will injure nothing, stain nothing destroy nothing, but it will kill fire from any cause, and it will do it instantly.

Pyrene liquid does not lose its strength or deteriorate with age, and does not require recharging unless used. It will not freeze at 50 degrees below zero.

Approved and labeled by the underwriters' Laboratories.

Price, Extinguisher Complete with Black Enameled Bracket.....	**10.50**
Price Pyrene Liquid per quart can	**1.55**
" " " " gallon "	**6.20**

JOHNS-MANVILLE FIRE EXTINGUISHERS

If you'll recollect how you have seen a fire smothered effectively, by throwing a blanket over it, you will understand the principle on which the Johns-Manville Fire Extinguisher works. The blanket in this case is simply a cloud of gas which enfolds the flame and suffocates it into nothingness. The gas is formed by a harmless liquid projected from a handy container, which liquid, as it strikes the flame, liberates a gas blanket of great area and cuts off the oxygen in the air on which fire thrives.

The Johns-Manville can be pumped up and then aimed directly at the blaze or you can pump as you use it. In addition, you can use this extinguisher in close quarters. It shoots straight.

It chokes any incipient fire, including those from gasoline, oily waste and flames of a like origin, when water and other chemicals are insufficient.

Inspected and approved and labeled by the Underwriters' Laboratories, Inc., under direction of the National Board of Fire Underwriters. Entitles the owner to 15 per cent reduction on his auto fire insurance premium.

Price, Either Brass or Nickel-plated Finish, Complete, including Bracket.....each	**10.00**

J-M Fluid, 1.50 a quart.

FIRE EQUIPMENT

PATROL FIRE EXTINGUISHERS

Fig. 25944A

This machine is of the tip-over type, and is made expressly for commercial use of all kinds. Being properly filled ready for service, it is simply grasped, turned over quickly, and instantly produces a powerful stream. Any woman or child can operate it easily, and it is a most effective machine for interior fires.

The Patrol consists of a copper cylinder 21¾ inches in height, 7 inches in diameter. To operate, fill nearly to the top with water. Into this water mix 1½ pounds bicarbonate of soda. In the head of the extinguisher, which is detachable, is a brass cage into which is inserted a bottle half full of sulphuric acid. The acid bottle is closed by a loose lead stopper.

To discharge, the extinguisher is inverted, the lead stopper at once drops from the bottle, the sulphuric acid mixes with the soda solution and a large volume of carbonic acid gas is formed.

The Patrol Extinguisher embodies the best material and workmanship, the shell being seamless and made to withstand a pressure of 350 pounds.

Inspected, approved and labeled by the Underwriters' Laboratories.

Price, Polished Copper.....each **20.00**
" Nickel-plated..... " **23.00**

ALERT FIRE EXTINGUISHERS

Fig. 25944B

For general household and commercial use. The dome and bottom are fastened by lock joints. The main sheet will rupture before joints will yield. The interior is coated by immersion in molten metal, insuring thick, even coating. All soldering is done by blowpipes, giving even heat throughout. No irons are used.

Equipped with heavy cast brass bottle holder or cage, not wire. Has rawhide non-sticking, durable gasket at top. Ground joint at hose elbow.

Heavy non-breakable pure lead stopper. Exceptionally fine finish.

To operate, fill nearly to the top with water. Into this water is mixed 1½ pounds of bicarbonate of soda. In the head of the extinguisher, which is detachable, is a brass cage into which is inserted a bottle half full of sulphuric acid. The acid bottle is closed by a loose lead stopper.

To discharge, the extinguisher is inverted, the lead stopper at once drops from the bottle and the sulphuric acid mixes with the soda, causing a large volume of carbonic acid gas to be formed, which is strong enough to throw a stream of chemical water 50 feet.

Price, Polished Copper.....each **15.00**
" Nickel-plated..... " **17.00**

PLUNGER AND CYLINDER LEATHERS

CRIMPED PLUNGER LEATHER

Fig. 23623A

LOWER VALVE LEATHER

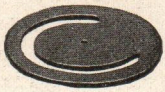


Fig. 23623B

TOP RING LEATHER

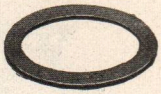


Fig. 23623C

CRIMPED PLUNGER LEATHERS

Size Inches	Oak-Tanned Price Each	Oak-Tanned Price per Dozen	Black Price Each	Black Price per Dozen	Size Inches	Oak-Tanned Price Each	Oak-Tanned Price per Dozen	Black Price Each	Black Price per Doz.
1¼	.05	.50	.05	.59	3¾	.26	3.30	.30	3.55
1⅜	.06	.63	.06	.67	4	.32	3.84	.36	4.21
1⅞	.08	.96	.09	1.05	4¼	.38	4.50	.40	4.75
2	.08	.96	.09	1.05	4½	.42	5.05	.45	5.38
2¼	.10	1 13	.11	1.21	4¾	.49	5.88	.53	6.25
2½	.12	1.34	.13	1.38	5¼	.63	7.50	.68	8.10
2¾	.13	1.51	.14	1.67	5¾	.87	9.17	.83	9.98
3	.15	1.80	.17	1.95	6½	.97	11.65	1.05	12.59
3¼	.17	2.00	.18	2.17	7½	1.25	15.00	1.35	16.17
3½	.21	2.51	.23	2.71	9½	2.02	24.17	2.18	26.00

TOP RING AND VALVE LEATHERS

For Cyl. In.	Outside Diameter Inches	Valve Leathers Price Each	Valve Leathers Price per Dozen	Top Ring Leathers Price Each	Top Ring Leathers Price per Doz.
2	2½	.05	.55	.03½	.38
2¼	2¾	.05½	.68	.04	.42
2½	3	.06	.71	.04½	.50
2¾	3¼	.07	.84	.05	.59
3	3½	.08	.88	.06	.67
3¼	3¾	.09	1.08	.07	.80
3½	4	.11	1.30	.08	.96
4	4½	.13	1.50	.09	1.08
4½	5	.15	1.75	.11	1.25

LEATHER U CUPS OR CRIMPS

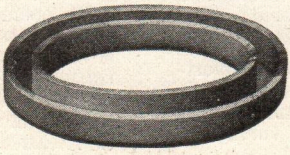


Fig. 23623D

Hydraulic U cups are made from the highest grade of oak-tanned leather, especially selected and treated for this purpose.

Each cup is perfectly formed and will always retain its shape.

In ordering, give thickness of stock, inside diameter of cylinder, diameter of piston, inside and outside depth of packing, amount of pressure, style of machine and whether used for air, water, oil or chemicals.

O. S. Diameter	inches	7¼	8⅜	16
Price	each	2.80	3.30	9.00

DIAPHRAGMS

DIAPHRAGM SHEET PACKING

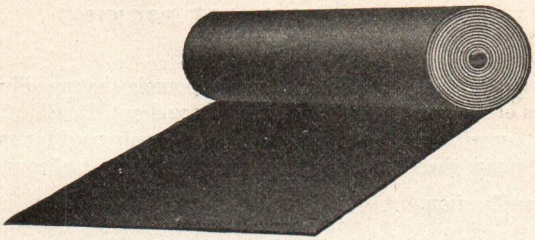


Fig. 21864A

Made of a superior quality of rubber, with a special woven heavy duck insertion, duck one side or duck both sides, any thickness desired, with a superior quality of friction between plies.

For steam, water and damper regulators.

Price.....per pound **1.50**

DIAPHRAGMS FOR SUCTION PUMPS

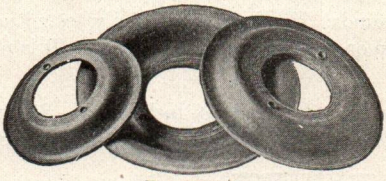


Fig. 21864B

Pumps used for pumping water from sewers, cellars and excavations require an especially constructed diaphragm of durable rubber. We list here those of proper proportion and size to give satisfaction in any standard make of hand-operated diaphragm pump.

DIAPHRAGMS FOR EDSON, GOULD OR CLOW PUMPS

No.	Diam. Inches	Hole Inches	Bolt Circle Inches
2	11	4 3/16	4 11/16
3	12 3/4	4 7/8	6 3/4
4	14 3/4	5 5/8	6 13/16

PRESSURE REGULATOR DIAPHRAGMS

Fig. 21864C

Pure gum diaphragm made for heater or pressure regulators in standard sizes listed below or special sizes to order.

For Low Pressure.....inches 6 1/4, 6 3/4, 7, 8, 9 and 10
" High " ..... " 9 and 10

SHEET PACKINGS

MASSCO RED SHEET PACKING

It is made of soft, tenacious red rubber compounds that readily adjust themselves to the unevenness of flanges. They run uniform throughout. It will not deteriorate. It can be furnished plain or with brass wire insertion. Commonly used for gaskets, intermediate and low cylinder, steam sheet, etc., work. It will give the best of results.

Prices upon application.

MASSCO HIGH PRESSURE STEAM PACKING

This packing is made from a combination of very carefully selected long fibre asbestos and high quality of rubber. For high pressures, superheated steam lines, where vibration, acid, gas and oil, etc., may be present in addition to the steam. It is an economical packing, as you can pack a joint with a thinner sheet. This makes more joints per pound. It can be used repeatedly on flange joints. Head can be removed without destroying Massco. In fact it is a packing for most any service and will give the best of satisfaction. Its tensile strength exceeds 3000 pounds. Has been successfully tested up to 1200 degrees and 900 pounds without letting go or showing signs of weakness. It is plain or graphited on one or both sides.

Furnished in sheets $\frac{1}{32}$, $\frac{1}{16}$, $\frac{3}{32}$ and $\frac{1}{8}$ inch thick. Stocked in sheets 50x50 inches. Weight about 9½ pounds per sheet 50x50 inches, $\frac{1}{16}$-inch thickness.

It is widely used for gasket purposes.

Prices upon application.

MASSCO SHEET PACKING

C. I. AND C. B. S.

A high-grade rubber sheet packing of exceptional merit for all cold water purposes. Either cloth inserted or cloth on both sides.

Furnished in all standard thicknesses from $\frac{1}{16}$ to $\frac{1}{4}$ inch.

Prices upon application.

MASSCO SQUARE FINE DUCK WHITE SHEET PACKING

Made of well frictioned fine duck, accurately cut to size and can readily be cut to fill the stuffing box exactly.

Packed in 12-foot coils, in individual pasteboard cartons.

Prices upon application.

PACKING AND PUMP VALVES

MASSCO BLACK FACE SPIRAL PISTON PACKING

LOW PRESSURE

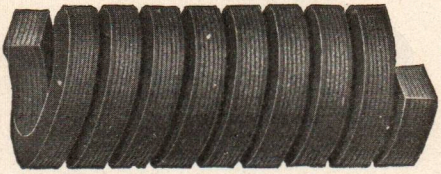


Fig. 30677A

Plenty of pistons are packed with packing which is better and consequently, more expensive than the working conditions demand.

Where the pressure does not exceed 100 pounds and the work is normal, Massco Black Face (Low Pressure) Square Spiral Packing will deliver service to suit a king's taste.

Under conditions commonly met in connection with steam and hot water rods, it shows unusual durability, and it's much more economical to use.

Prices upon application.

MASSCO RED FACE PACKING

HIGH PRESSURE

For the same purpose as Massco Black Face (Low Pressure) except it is used where the pressure runs from 100 to 300 pounds.

Comes in lengths approximately 12 feet each, packed in individual cartons.

Prices upon application.

MASSCO PUMP VALVES

No. 20 SOFT

Fig. 30677B

Cold water valve. Recommended for gritty, muddy or sandy water.

Maximum heat, 150 degrees. Pressure, 175 pounds.

Especially recommended for straight mine lifts 300 feet or less.

Prices upon application.

MASSCO PUMP VALVES

No. 60 MEDIUM

Fig. 30676A

Warm water valve. Maximum heat, 170 degrees. Pressure, 350 pounds.

For shaft mine lifts from 300 to 700 feet.

Prices upon application.

No. 240 HARD

Fig. 30676B

Hot water valves recommended for all hot water service.

Maximum heat, 212 degrees. Pressure, 300 pounds.

Also recommended for pumping oil, ammonia, brine, acids and syrup.

WHEN ORDERING

Should there by any doubt as to the grade of valve required, state the kind of service in which the valves are to be used, the fluid handled, pressure or head pump it is working against, etc.

In all cases give inside and outside diameter, thickness and size of hole.

PACKINGS

RAWHIDE HYDRAULIC

Fig. 9670A

SQUARE FLAX IN BOX

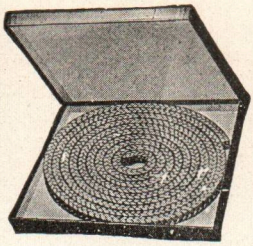


Fig. 9670B

SQUARE FLAX ON REEL

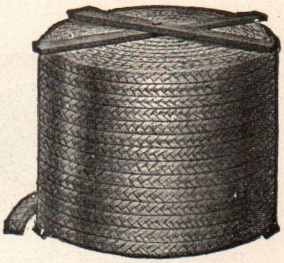


Fig. 9670C

RAWHIDE HYDRAULIC

Rawhide packing will not cut a rod or cylinder, on account of the nature of the material of which it is composed, namely a specially prepared rawhide, which is a lubricant of itself, consequently anti-frictional.

Price, Size ¼ to 2-inch.....per pound **2.00**

SQUARE FLAX

The best or first grade is made of the finest grade of pure Archangle extra long Russian flax and possessing great strength. The medium grade is braided without cores and center. The competition grade is a flax not possessing fiber of such length as the two first grades.

Price, Best or First Grade, ¼ to 2 inches, in Box or Reels.....per pound **.80**
" Medium Grade, ¼ to 2 inches, in Box or Reels..... " **.50**
" Competition, ¼ to 2 inches, in Box or Reels..... " **.40**

RUBBER BACK FLAX

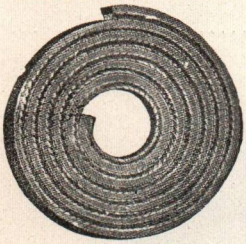


Fig. 9670D

SQUARE HYDRAULIC FLAX

Fig. 9670E

HEMP AND JUTE

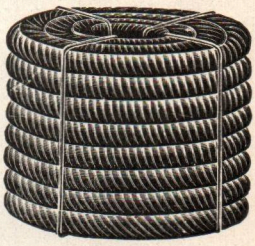


Fig. 9670F

RUBBER BACK FLAX

Rubber back flax is especially adapted for all hydraulic and elevator work.

Price, Sizes ¼ to 1½-inch, in Coils of about 15 feet.....per pound **1.50**

SQUARE HYDRAULIC FLAX

For all hydraulic purposes, cold water ends of pumps, elevator rods and cylinders, presses, accumulators, oil and brine pumps, etc.

Price, Size ¼ to 1½-inch.....per pound **2.00**

HEMP AND JUTE PACKING

Price, American Hemp Packing.....per pound ....
" Italian A " " ..... " ....
" " B " " ..... " ....
" " AA " " ..... " ....
" Jute Packing, for Caulking..... " ....

PACKINGS

CANDLE WICK

Fig. 27273A

ASBESTOS WICK

Fig. 27273B

CANDLE WICK

Put up in ⅛ and ¼-pound balls.

Price.....per pound ...

ASBESTOS WICK

Price, Standard Grade, ¼, ½ and 1-lb. Balls, 5 and 10-lb. Spools..... per pound ...

ASBESTOS ROPE

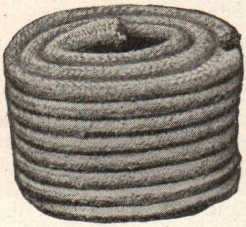


Fig. 27273C

Standard twist. Put up on reels of 10 and 25 pounds.

Price.....per pound ...

HEMP AND JUTE

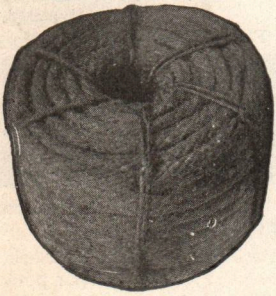


Fig. 27273D

JUTE TWINE

Fig. 27273E

ITALIAN HEMP

Price.....per pound .20

UNTARRED CALKING JUTE

Price.....per pound .20

JUTE TWINE

Price, ¼ and ½-pound Balls.....per pound ...

MARLIN TWINE

Price, 1-pound Balls.....per pound ...

" 10-pound Balls..... " ...

For packing and rope binding.

PACKINGS

ROUND PISTON

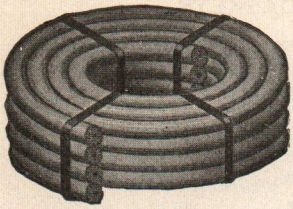


Fig. 9668A

RUBBER BACK

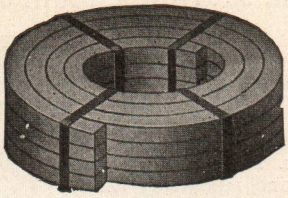


Fig. 9668B

HYDRAULIC

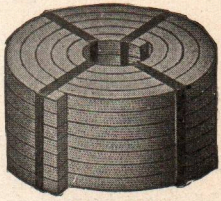


Fig. 9668C

Price, Round and Square Piston Packing.....per pound .85
" Square Piston Packing, with Rubber Back ..... " 1.00
" Hydraulic or Pump Piston Packing..... ..... " 1.00

SECTIONAL RING

Fig. 9668D

EXPANSION RING

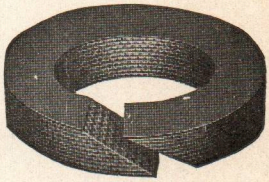


Fig. 9668E

Price, Sectional, Expansion and Spiral Ring Packing .....per pound 1.20

RED RUBBER CORE PACKING

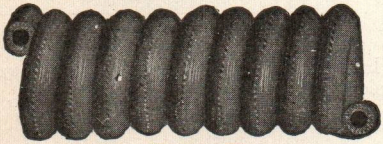


Fig. 9668F

FLAT GUM CORE PACKING

Fig. 9668G

Price, Red Rubber Core, Wrapped with Loosely Woven Duck and Impregnated with Plumbago .....per lb. 1.00
Price, Flat Gum Core Packing. Boxes 5 and 10 Lbs., Reels 25 to 100 Lbs.. " .60
" Round Gum Core Packing, Same as Flat Gum Core ..... " .50

DIAGONAL EXPANSION PACKING

LOW PRESSURE

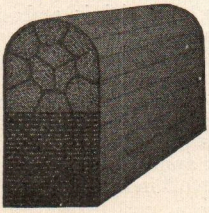


Fig. 9668H

HIGH PRESSURE

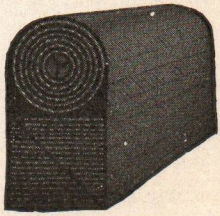


Fig. 9668J

Price, Low Pressure.....per pound 1.25
" High " ..... " 1.50

SECTIONAL GASKETS AND TAPE

ECLIPSE SECTIONAL RAINBOW GASKETS

The Eclipse Gasket is red in color and is composed of the celebrated Rainbow Packing Compound.

It will not harden or blow out under high pressures and temperatures.

It can be taken out and repeatedly used. Joints can be made in from 3 to 5 minutes.

It is put up in boxes with a sectional illustration of the gasket and the trade mark in red on the top of every box. Explicit directions, extra metal tubes and a roll of gummed tape for wrapping joint spirally, accompany each box.

Diam. Inches	Contents Feet	Weight Pounds
¼	48	1½
⅜	36	2¾
½	36	5
⅝	24	5¾
¾	18	6
⅞	12	6¼
1	12	7

Price, 1.00 per pound.

Fig. 26345A

¼ and ⅜-inch, for pipe unions. ½-inch for handhole plates. ⅝ and ¾-inch for manhole plates. ⅞ and 1-inch, for extra large manhole plates.

GARCO PERFECT ADJUSTABLE GASKET TAPE

Fig. 26345B

A perfect gasket material that is practically indestructible and guaranteed for any pressure as well as not to burn or blow out. It is manufactured of the best grade of asbestos under a patented process in which the asbestos or body of the tape is thoroughly incorporated in a network of wire.

The joining material is embodied in the gasket itself, running through the entire length of the tape and requires no other fasteners of any nature to complete the joint. When the joint is made as directed the gasket is of uniform thickness throughout.

The tape is packed in continuous rolls in boxes containing approximately 10 to 12 pounds and is to be cut off in suitable lengths for the gasket desired.

Made in the following widths: ¾, 1, 1¼ and 1½-inch.

Price.....per pound .....

GASKETS

CLOTH INSERTED

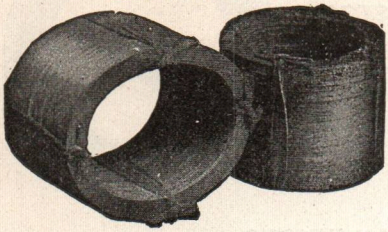


Fig. 14152A

ASBESTOS FOLDED

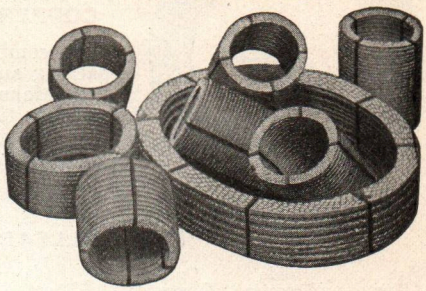


Fig. 14152B

CLOTH INSERTED—STOCK SIZES

Size Inches	Flange Inches	Size Inches	Flange Inches	Size Inches	Flange Inches	Size Inches	Flange Inches
2 x3	5/8	4 x6	3/4	9 x14½	1¼	11 x14	1¼
2 x3½	5/8	4½x 5½	7/8	9 x15	1¼	11 x14½	1¼
2½x3	5/8	4½x 6	7/8	9½x12½	1¼	11 x15	1¼
2½x3½	5/8	4½x 6½	7/8	9½x14	1¼	11 x15½	1¼
2½x4	5/8	5 x 7	1	9 x14½	1¼	11 x16	1¼
2½x4½	5/8	6 x 7½	1	9½x15	1¼	11½x14	1¼
3 x4	3/4	6 x 8	1	9½x15½	1¼	11½x14½	1¼
3 x4½	3/4	6 x10	1	10 x14	1¼	11½x15	1¼
3 x5	3/4	6½x 7	1	10 x14½	1¼	11½x15½	1¼
3 x5½	3/4	6½x 7½	1	10 x15	1¼	11½x16	1¼
3½x4	3/4	7 x 9	1	10 x15½	1¼	12 x15	1¼
3½x4½	3/4	8 x11	1¼	10 x16	1¼	12 x15½	1¼
3½x5	3/4	8 x11½	1¼	10½x14	1¼	12 x16	1¼
3½x5½	3/4	8 x14	1¼	10½x14½	1¼	12½x15	1¼
3½x6	3/4	9 x12	1¼	10½x15	1¼	12½x16	1¼
4 x5	3/4	9 x12½	1¼	10½x15½	1¼	.....	...
4 x5½	3/4	9 x14	1¼	10½x16	1¼	.....	...

Sizes 2x3 to 7x9 inches, inclusive, 3/16 inch thick; price, 1.00 per pound. Sizes 8x11 inches and larger, ¼ inch thick; price, .80 per pound.

ASBESTOS FOLDED

For Manholes, Handholes and Flange Joints

These gaskets will stand any temperature and pressure of steam.

They may be re-used many times. We know of places where these gaskets have been in continual use for two years without renewal.

Folded by hand and made of asbestos sheeting, each thread of which, both ways of the cloth, contains a fine composition wire. They have no raw edges. They give perfect satisfaction and will cost less per day of service than any other gasket ever made.

Price.....per pound **1.50**

Furnished in any size, shape or thickness. In ordering, give inside diameters and width of flange.

McKIM GASKETS

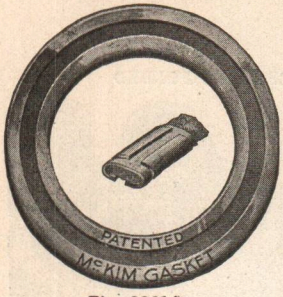


Fig. 3861A

COPPER-ASBESTOS

They combine the elasticity of packing and the strength of metal. Make tight joints and keep joints tight. Made in all shapes and sizes for all conditions of service.

Fig. 3861B

FOR MALLEABLE IRON UNIONS

Size of Pipe Inches	Inside Diameter Inches	Outside Diameter Inches	Price per 100
1/8	1/2	3/4	1.00
1/4	9/16	7/8	1.00
3/8	19/32	15/16	1.20
1/2	13/16	1 3/16	1.50
3/4	15/16	1 1/2	2.25
1	1 3/16	1 3/4	2.75
1 1/4	1 1/2	2 5/32	3.00

Size of Pipe Inches	Inside Diameter Inches	Outside Diameter Inches	Price per 100
1 1/2	1 3/4	2 1/2	3.50
1 3/4	2	2 11/16	3.60
2	2 1/4	2 29/32	3.75
2 1/4	2 3/4	3 1/4	4.50
2 1/2	2 15/16	3 9/16	4.50
3	3 5/8	4 1/4	6.00
...	...	...	....

FOR STANDARD FLANGED FITTINGS

Size of Pipe Inches	Inside Diam. Inches	Outside Diam. Inches	Width of Gasket Inches	Price, Each Single Jacket	Price, Each Double Jacket
1	1 11/16	2 3/16	1/4	.07	.11
1 1/4	2	2 11/16	11/32	.08	.12
1 1/2	2 1/4	3 1/4	1/2	.10	.15
2	3	4	1/2	.14	.21
2 1/2	3 3/4	4 3/4	1/2	.16	.24
3	4 1/4	5 1/4	1/2	.20	.30
3 1/2	5 1/8	6 1/4	9/16	.30	.45
4	5 3/8	6 5/8	5/8	.34	.51
4 1/2	5 1/2	6 7/8	11/16	.38	.57
5	6 1/8	7 5/8	3/4	.47	.71
6	7	8 5/8	13/16	.55	.83
7	8 1/8	9 7/8	7/8	.68	1.02
8	9 1/8	10 7/8	7/8	.75	1.13
9	10 3/8	12 3/8	1	.90	1.35
10	11	13 1/4	1 1/8	1.00	1.50
12	13 3/4	16	1 1/8	1.25	1.88
14	15 3/8	17 5/8	1 1/8	1.60	2.40
15	16 1/2	18 7/8	1 3/16	1.90	2.85
16	17 5/8	20 1/8	1 1/4	2.15	3.23
18	18 3/4	21 1/2	1 3/8	2.50	3.75
20	20 3/4	23 3/4	1 1/2	3.00	4.50
22	22 7/8	25 7/8	1 1/2	3.30	4.95
24	25 1/8	28 1/8	1 1/2	3.80	5.70

FOR EXTRA HEAVY FLANGED FITTINGS

Size of Pipe Inches	Inside Diam. Inches	Outside Diam. Inches	Width of Gasket Inches	Price, Each Single Jacket	Price, Each Double Jacket
1	1 3/4	2 1/2	3/8	.07	.11
1 1/4	2 1/8	3 1/8	1/2	.10	.15
1 1/2	2 3/4	3 3/4	1/2	.14	.21
2	3 1/4	4 1/4	1/2	.17	.25
2 1/2	3 3/4	5	5/8	.20	.30
3	4 5/8	5 7/8	5/8	.25	.38
3 1/2	5 1/8	6 1/2	11/16	.30	.45
4	5 1/2	7	3/4	.38	.57
4 1/2	6 1/8	7 5/8	3/4	.47	.71
5	6 3/4	8 3/8	13/16	.53	.80
6	8 1/8	9 3/4	13/16	.65	.98
7	9 1/8	10 7/8	7/8	.75	1.13
8	10	12	1	.83	1.25
9	11	13	1	.90	1.35
10	11 3/4	14 1/4	1 1/4	1.10	1.65
12	14	16 3/4	1 3/8	1.35	2.03
14	16 1/4	19	1 3/8	1.90	2.85
15	17 1/8	19 7/8	1 3/8	2.10	3.15
16	18 1/2	21 3/8	1 7/16	2.50	3.75
18	20 1/2	23 3/8	1 7/16	2.90	4.35
20	22 1/2	25 1/2	1 1/2	3.20	4.80
22	24 1/2	27 1/2	1 1/2	3.50	5.25
24	27	30	1 1/2	4.10	6.15

Special gaskets not included in foregoing schedules. Made to order on short notice at proportionate prices. The McKim Gaskets for flanged fittings are made with single and double jackets. Use single jacket gaskets for low pressure and ordinary work. Use double jacket gaskets for high pressure work and extreme service.

ASBESTOS MILLBOARD, PAPER, ETC.

ASBESTOS SHEET MILLBOARD

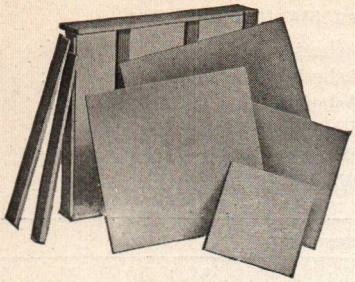


Fig. 9943A

NON-BURN ASBESTOS FELT AND ROLL BOARD

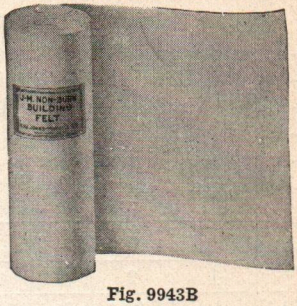


Fig. 9943B

ASBESTOS SHEET MILLBOARD—Standard Sheets 40x40 or 48x48 Inches

Especially adapted for fireproof lining of floors, partitions, etc. Also for packings, fire screens, linings for ranges, stoves, grates, gas backs, etc.

Approx. Thickness.....inches	1/32	3/64	1/16	3/32	1/8	3/16	1/4	3/8	1/2
" Weight per Sheet.....pounds	2	3	4	6	8	12	14	23	27

Made in three grades, hard, medium and soft. Medium furnished, unless otherwise specified. Prices on application.

NON-BURN ASBESTOS FELT AND ROLL BOARD

This is a fireproof material especially adapted for fireproof construction because of its heat-resisting qualities. Will not distintegrate, is oderless and vermin-proof. Asbestos felt weighs 6 to 30 pounds per 100 square feet; asbestos roll board is 3/32 and 1/8 inch thick. Prices on application.

ASBESTOS CEMENT

Fig. 9943C

HAIR FELT

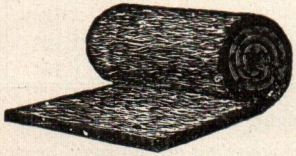


Fig. 9943D

ASBESTOCEL CORRUGATED FIREPROOF PAPER

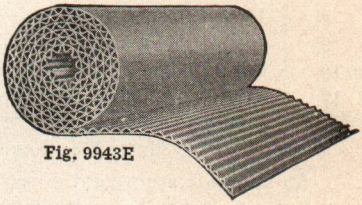


Fig. 9943E

ASBESTOS CEMENT

Price, Asbestos Cement, in 100-pound Bags.....per bag ....
" 85 per cent Magnesia, in 60-pound Bags..... " ....

MINERAL WOOL

Price, in Sacks of about 50 pounds.....per pound ....

In bulk, prices on application. Weighs about 12 pounds per cubic foot. Bags .12 each.

HAIR FELT—In Rolls of 300 Square Feet; Width, 6 Feet

Thickness.....inches	1/4	1/2	3/4	1	1 1/2	2
Price.....per square foot	....	....	....	....	....	....

ASBESTOCEL CORRUGATED FIREPROOF PAPER

Price, 1-ply, 1/4 inch Thick, 250 Square Feet per Roll.....per square foot ....
" 2 " 1/2 " " 130 " " " ..... " ....

Prices on application.

SECTIONAL PIPE COVERINGS

WEIGHTS

Weight in Pounds, per 3-foot Section, Standard Thickness

1—Asbesto-Sponge Felted, 1 inch thick
2—Asbestos Fire-Felt, 1 inch thick
3—85 Per Cent Magnesia, Stand. thickness
4—Asbestocel, ½ inch thick
5—Asbestocel, ¾ inch thick
6—Asbestocel, 1 inch thick
7—Asbestos Air Cell, ½ inch thick
8—Asbestos Air Cell, ¾ inch thick
9—Asbestos Air Cell, 1 inch thick
10—Wool Felt ½ inch thick
11—Wool Felt, ¾ inch thick
12—Wool Felt, 1 inch thick

Size Inches	Style of Covering, No.											
	1	2	3	4	5	6	7	8	9	10	11	12
½	4	2¼	2¼	1¾	2	3	1½	1¾	2½	16 oz.	1¾	2¼
¾	4½	2¾	2½	2¼	2½	3½	1¾	2	3	18 "	2	2½
1	5	3	2¾	2½	3	4	2	2½	3½	19 "	2¼	3
1¼	6	3½	3½	2¾	3¼	4½	2¼	2¾	4	1¼	2½	4
1½	7	4	4¼	3	3¾	5	2½	3	4½	1½	2¾	4½
2	8	5	4½	3¼	4½	6	2¾	3⅙	5	1¾	3	5
2½	8½	6	5½	3¾	5½	7	3	3¾	6	2	3¼	6
3	9	7	6¾	4	6½	8	3½	5	7	2¼	3¾	7
3½	10	8½	7½	4¼	7	8½	3¾	6	7½	2½	4¼	8
4	11½	9	8½	4½	7¼	9	4	6½	8	3	4¾	8½
4½	13	9½	10½	4¾	7½	9½	5	7	8½	3¼	5¼	10
5	14½	10	12¼	5	7¾	10	5½	7½	9	3½	5½	11
6	16	12½	13¾	5½	8	11	6	8	9½	4¼	6½	12
7	17½	13¾	15½	6¾	9	12½	6½	8½	10	4¾	7½	13
8	19	15¾	18	7½	10	15	7	9	11	5½	8½	14
9	20	16½	21	8	12	16	7½	10	12	6¾	11	15
10	24	18	24	9	13	17½	8½	11	12½	7¼	11¾	16
12	33	21	33	11	15	20	10	13	15	8¾	12½	18

Size of crate, 36x36x36 inches. Weight, 70 pounds.

An approximate weight of sectional covering crated may be secured by adding 25 per cent to weight of covering uncrated. The smaller coverings are telescoped in larger ones when packed, and hence it is difficult to get more than an approximate idea of the weight per crate.

BLOCKS, SHEETS AND ROLLS

The following is the weight per square foot, 1 inch thick, of various blocks, sheets, and rolls. Other thicknesses are proportionate.

Asbesto-Sponge Felted Sheets (2x3 feet) ..... 2½ pounds
Asbestos Fire-Felt Blocks or Sheets (24x36 inches or 6x36 inches) ..... 1½ "
85 Per Cent Magnesia Blocks (3x18 inches or 6x36 inches) ..... 1½ "
*Asbestos Molded Blocks (4x18 inches) ..... 2¾ "
Asbestos Air Cell Sheets, ¼-inch corrugation, 3x3 feet ..... 2 "
1-ply Asbestos Air Cell Paper, Rolls of 240 square feet ..... 75 "

*Cannot be furnished less than 1½ inches thick.

SECTIONAL PIPE INSULATIONS

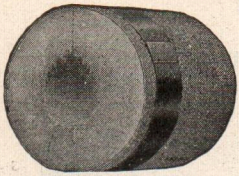


Fig. 2683A

85 PER CENT MAGNESIA

FOR HIGH PRESSURE AND SUPERHEATED STEAM PIPES

This well-known form of high pressure pipe insulation combines the high non-conducting qualities of carbonate of magnesia and asbestos in a light, highly efficient insulation. It is recommended for high pressure and superheated steam surfaces. This insulation is furnished in various thicknesses from 1 to 3 inches, sectional form, to fit standard pipes ½ to 14 inches; for larger pipes, curved segments or blocks are supplied.

AIR-CELL

FOR MEDIUM STEAM PRESSURE AND HEATING PIPES

A light cellular covering constructed of corrugated asbestos paper, with the channels running lengthwise of the pipe. A well-known covering for medium and low pressure steam and hot water pipes. Made in thicknesses of ½ to 3 inches, to fit all standard sizes of pipe.

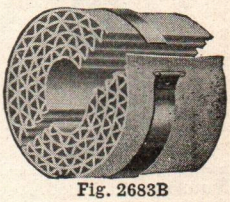


Fig. 2683B

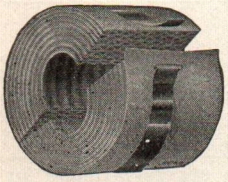


Fig. 2683C

ASBESTOCEL

FOR HIGH STEAM PRESSURE PIPES

Asbestocel insulation is built on the arch principle, the channels running around the pipe instead of lengthwise. This prevents the circulation of air, which is the great objection to ordinary longitudinal air cell coverings. It will not crush down nor lose its strength, and successfully withstands vibration and hard usage. There is a minimum loss by breakage in transportation or application. Made in thicknesses of ½ to 3 inches,to fit standard sizes of pipe.

WOOL FELT

FOR LOW PRESSURE STEAM AND HOT WATER HEATING SYSTEMS

Made in sections 3 feet long and manufactured in three styles: Standard—Corrugated laminations of wool felt 1 inch thick, with an interlining of two layers of asbestos paper. Champion or Express—Corrugated laminations of wool felt ¾ inch thick with one layer of asbestos paper. Aqua or C. B. —Corrugated laminations of wool felt ½ inch thick with one layer of asbestos paper. ½ inch will be shipped, unless otherwise specified.

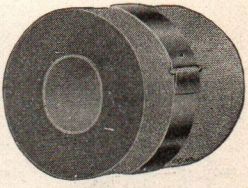


Fig. 2683D

STANDARD LIST FOR ALL STYLES—WITH BRASS-LACQUERED BANDS

Inside Diameter of Pipe ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Price, Covering.....per foot	.22	.24	.27	.30	.33	.36	.40	.45	.50
" Elbow Covers.....each	.30	.30	.30	.30	.30	.36	.42	.48	.54
" Tee " ..... "	.36	.36	.36	.36	.36	.42	.48	.54	.60
" Cross " ..... "	.48	.48	.48	.48	.48	.54	.60	.70	.80
" Valve " ..... "	.54	.54	.54	.54	.54	.60	.78	.96	1.20
Inside Diameter of Pipe ....inches	**4**	**4½**	**5**	**6**	**7**	**8**	**9**	**10**	**12**
Price, Covering .....per foot	.60	.65	.70	.80	1.00	1.10	1.20	1.30	1.85
" Elbow Covers.....each	.60	.72	.90	1.30	1.80	2.40	3.00	3.60	....
" Tee " ..... "	.75	.90	1.20	1.60	2.20	3.00	3.80	4.60	....
" Cross " ..... "	.95	1.10	1.50	2.00	2.80	3.60	4.40	5.20	....
" Valve " ..... "	1.50	1.85	2.25	2.80	3.60	4.40	5.30	6.20	....
Outside Diameter of Pipe ...inches	**14**	**16**	**18**	**20**	**24**	**30**	....	....	....
Price, Covering .....per foot	2.10	2.35	2.60	2.85	3.30	4.00	....	....	....

GREASE CUPS

EMPRESS PLAIN COMPRESSION

FITTED WITH LEATHER WASHERS

STANDARD — EXTERIOR

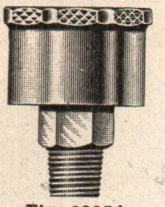


Fig. 6385A

SECTIONAL

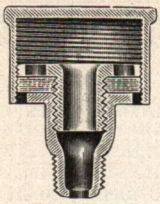


Fig. 6385B

WITH WING CAP — EXTERIOR

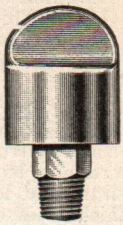


Fig. 6385C

SHOWING SPANNER HOLES

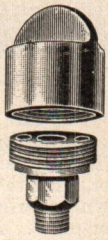


Fig. 6385D

Number	000	00	0	1	2	3	4
Capacity ..... ounces	¼	½	⅔	1	2	3½	5
Inside Diameter ..... inches	¾	1	1¼	1½	2	2½	3
Size of Thread ..... "	⅛	⅛	¼	¼	⅜	½	½
" " Optional Thread ..... "	....	....	⅛	⅛	¼	⅜	⅜
Price, Dull Brass Finish ..... each	.46	.56	.74	.96	1.28	1.76	3.00
" Finished Brass ..... "	.58	.70	.90	1.15	1.50	2.15	3.50
" Brass, Nickel-plated ..... "	.75	.82	1.06	1.36	1.80	2.60	4.10

Optional threads will be furnished when so ordered. An extra charge is made for cups fitted with wing caps.

EMPRESS RATCHET BRASS AND STEEL

LUG CAP EXTERIOR

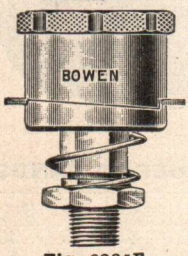


Fig. 6385E

WING CAP PERSPECTIVE

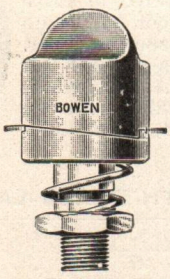


Fig. 6385F

SHORT PATTERN — LUG CAP EXTERIOR

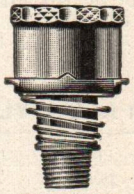


Fig. 6385G

WING CAP SECTIONAL

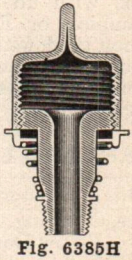


Fig. 6385H

Number	000	00	0	1	2	3
Capacity ..... ounces	¼	½	⅔	1	2	3½
Inside Diameter ..... inches	¾	1	1¼	1½	2	2½
Size of Thread ..... "	⅛	⅛	¼	¼	⅜	½
Price, Rough Steel ..... each	....	.80	.95	1.15	1.40	2.00
" " Brass ..... "	.90	1.10	1.35	1.70	2.30	3.10
" Finished Brass ..... "	1.05	1.25	1.50	1.90	2.50	3.40
" Brass, Nickel-plated ..... "	1.20	1.40	1.70	2.15	2.80	4.00

Short pattern cups are same capacities, dimensions and prices as regular pattern ratchet cups, and are made in both brass and steel. An extra charge is made for cups fitted with wing cups.

LUNKENHEIMER GREASE CUPS

JEWEL AUTOMATIC GREASE CUPS

EXTERIOR SECTIONAL

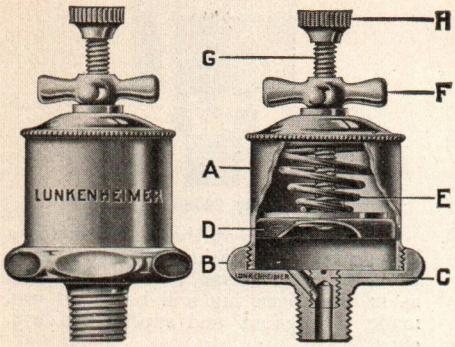


Fig. 24595A

Automatically feeds grease by means of a spring actuated plunger. The leather disc, held securely between plates, keeps grease from passing.

IDEAL AUTOMATIC GREASE CUPS

EXTERIOR SECTIONAL

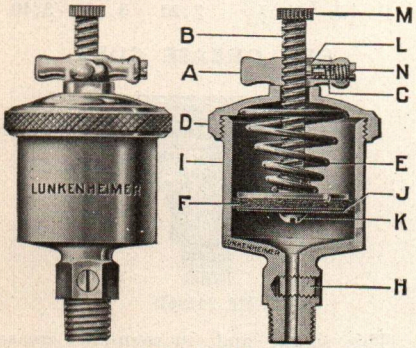


Fig. 24595B

A light, inexpensive reliable cup of the automatic type. Adapted for feeding lighter forms of grease.

No.	Cap. Ounces	Size Thread Inches	Price, Each Jewel Fin.	Jewel N. P.	Ideal Fin.	Ideal N. P.
00	⅓	⅛	.80	1.00	1.50	1.75
0	1	¼	1.00	1.30	2.00	2.25
1	1½	¼	1.30	1.70	2.50	2.80
2	3	⅜	1.70	2.20	3.20	3.60
3	6	½	2.30	2.90	4.30	5.00
4	10	½	3.20	3.90	6.00	6.75
5	18	¾	....	....	12.50	13.80

MARINE GREASE CUPS

EXTERIOR SECTIONAL

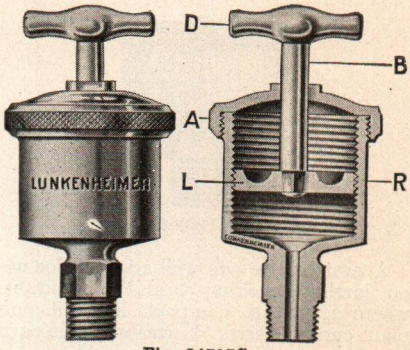


Fig. 24595C

With screw feed. It is designed more particularly for use on marine engines. Body is made heavy to withstand rough usage.

ATLAS GREASE CUPS

EXTERIOR SECTIONAL

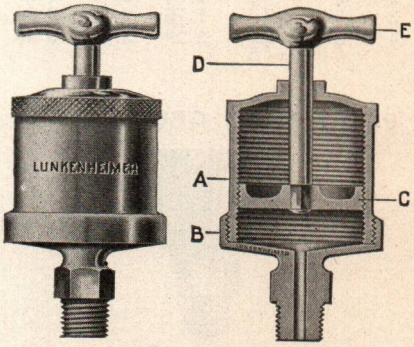


Fig. 24595D

This cup has the advantage of being easily filled. The body is removable for this purpose.

No.	Cap. Ounces	Size Thread Inches	Price, Each Marine Fin.	Marine N. P.	Atlas Fin.	Atlas N. P.
00	⅓	⅛	1.00	1.20	1.10	1.30
0	1	¼	1.20	1.45	1.40	1.65
1	1½	¼	1.60	1.90	1.80	2.10
2	3	⅜	2.00	2.40	2.20	2.60
3	6	½	2.80	3.40	3.40	4.00
4	10	½	4.00	4.75	4.50	5.25
5	18	¾	7.00	8.20	7.60	8.80

LUNKENHEIMER GREASE CUPS

TIGER GREASE CUPS

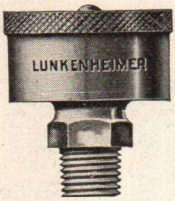


Fig. 24596A

A cast bronze cup well adapted for use on jarring machinery, and is desirable where a simple compact and efficient plain cup is desired. Furnished in finished bronze, unless otherwise specified.

No.	Cap. Ounces	Size Thread Inches	Price, Each Rough	Fin.	N. P.
000	1/8	1/8	...	.50	.60
00	1/2	1/8	.56	.70	.82
0	2/3	1/4	.74	.90	1.06
1	1	1/4	.96	1.15	1.36
2	2	3/8	1.28	1.50	1.80
3	3 1/2	1/2	1.76	2.15	2.60
4	5	1/2	3.20	3.30	3.40

PLAIN STEEL GREASE CUPS

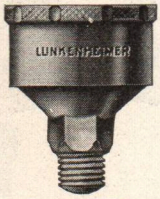


Fig. 24596B

Made of steel not cast iron and drawn to shape, is durable and will last a long time It is well made and is inexpensive.

No.	Capacity Ounces	Size Inches	Price Each
000	1/4	1/8	.20
00	1/2	1/8	.25
0	2/3	1/4	.35
1	1	1/4	.45
2	2	3/8	.55
3	3 1/2	1/2	.80
4	5	1/2	1.05

GEM GREASE CUPS

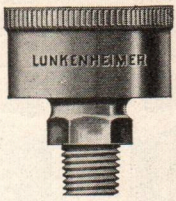


Fig. 24596C

Designed to meet the demands for a low priced, well finished brass cup. Not provided with spring lock arrangement as in the Tiger, but will be found well made throughout and superior to iron cups.

No.	Cap. Ounces	Size Thread Inches	Price, Each Rough	Fin.	N. P.
000	1/8	1/8	...	.50	.60
00	1/2	1/8	.56	.70	.80
0	2/3	1/4	.74	.90	1.00
1	1	1/4	.96	1.15	1.30
2	2	3/8	1.28	1.50	1.70
3	3 1/2	1/2	1.76	2.15	2.45
4	5	1/2	3.20	3.30	3.40

REX GREASE CUPS

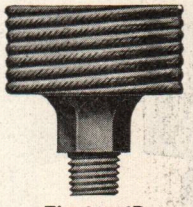


Fig. 24596D

This simple and inexpensive grease cup will be found equal to the more expensive plain cups when used for certain light purposes.

The top is made of spun brass, and, although very light in weight, is quite strong and will not jar off. Base is of cast bronze.

No.	Capacity Ounces	Size Thread Inches	Price Each
6	2/3	1/8	.55
7	1 1/2	1/4	.70
8	3 1/2	3/8	.90
9	5	3/8	1.20

LUNKENHEIMER GREASE CUPS

LOCK GREASE CUPS

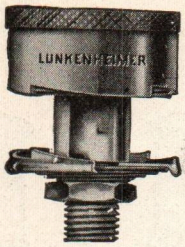


Fig. 24813A

Provided with a ratchet plate to prevent cap from jarring off. It is of the screw compression type. When operated the ratchet plate is prevented from turning by the two flat sides on the base.

No.	O. S. Diam. In.	Hgt. In.	Thd. In.	Cap. Oz.	Price, Brass	Each N. P.
000	15/16	1 13/16	1/8	1/8	.70	.85
00	1 5/32	2 1/8	1/8	1/2	.85	1.00
0	1 1/2	2 3/8	1/4	2/3	1.10	1.25
1	1 11/16	2 9/16	1/4	1	1.35	1.55
2	2 7/32	2 15/16	3/8	2	1.70	1.95

GUARD GREASE CUPS

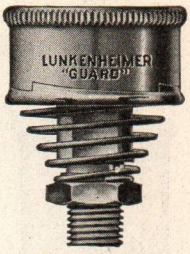


Fig. 24813C

This cup differs from the Lock Cup. only in the material of the cap, the Guard having a stamped brass cap. Lower in price than the Lock or Grip, but will be found substantial and serviceable.

No.	O. S. Diam. In.	Hgt. In.	Thd. In.	Cap. Oz.	Price, Brass	Each N. P.
000	15/16	1 13/16	1/8	1/8	.45	.60
00	1 5/32	2 1/8	1/8	1/2	.55	.70
0	1 1/2	2 3/8	1/4	2/3	.70	.85
1	1 11/16	2 9/16	1/4	1	.85	1.05
2	2 7/32	2 15/16	3/8	2	1.40	1.65

GRIP GREASE CUPS

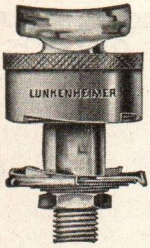


Fig. 24813B

The only difference between the Grip and the Lock Cup, illustrated above, lies in the addition of the wing handle, which facilitates the operation of the cup.

No.	O. S. Diam. In.	Hgt. In.	Thd. In.	Cap. Oz.	Price, Brass	Each N. P.
000	15/16	2 3/16	1/8	1/8	.80	.95
00	1 5/32	2 9/16	1/8	1/2	1.00	1.20
0	1 1/2	2 7/8	1/4	2/3	1.20	1.40
1	1 11/16	3 1/8	1/4	1	1.50	1.70
2	2 7/32	3 5/8	3/8	2	1.90	2.20

POSITIVE AND SURETY GREASE CUPS

Fig. 24813D

The Positive has a spring lock attachment and the Surety is without this attachment.

No.	O. S. Diam. In.	Hgt. In.	Thd. In.	Cap. Oz.	Price, Fin. Brass	Each Rough Brass
00	1 3/16	2	1/8	1/2	.85	.70
0	1 17/32	2 5/16	1/4	2/3	1.05	.90
1	1 23/32	2 21/32	1/4	1	1.35	1.15
2	2 1/4	2 31/32	3/8	2	1.80	1.50
3	2 25/32	3 15/32	1/2	3 1/2	2.40	2.00
4	3 9/32	3 13/16	1/2	5	3.60	3.00

LUNKENHEIMER OIL CUPS

SENTINEL GLASS BODY OIL CUPS

Fig. 24660A

No.	Capacity Ounces	Size Thread Inches	Price, Each Fin. Bronze	Price, Each Nickel-plated
0	5/8	1/8	3.00	3.50
1	1	1/4	3.25	3.75
1½	1½	1/4	3.50	4.00
2	2½	3/8	3.75	4.25
3	4	3/8	4.25	4.75
4	5	3/8	5.25	5.75
5	10	1/2	7.25	8.00
6	18	1/2	9.25	10.25
8	34	3/4	20.00	22.00

Fig. 24660B

OIL CUP GLASSES AND CORKS

Numbers correspond to numbers of Oil Cups illustrated.

No.	Outside Diam. Inches	Height Inches	Price Glasses Each	Price Washers per Doz.
000	1	7/8	.05	.15
00	1⅛	1	.06	.18
0	1¼	1⅛	.08	.24
1	1½	1⅜	.10	.30
1½	1¾	1⅝	.10	.36
2	2	1⅞	.12	.40
3	2¼	2⅛	.15	.45
4	2½	2⅜	.25	.50
5	3	3	.35	.60
6	3½	4	.65	.75
8	4¼	5	1.50	1.50

AUTOMATIC ROD OIL CUPS

SCREW FEED

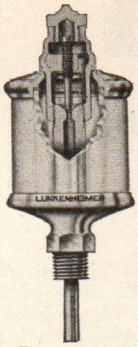


Fig. 24660C

NEEDLE VALVE FEED

Fig. 24660D

No.	Capacity Ounces	Size Thread Inches	Price, Each Fin. Bronze	Price, Each Nickel-plated
0	5/8	1/8	1.10	1.25
1	1	1/4	1.50	1.70
1½	1½	1/4	2.00	2.25
2	2½	3/8	2.50	2.75
3	4	3/8	3.00	3.30
4	5	3/8	4.00	4.35

Needle valve style not made in No. 0 size.

LOCOMOTIVE CRANK PIN OIL CUPS

EXTERIOR

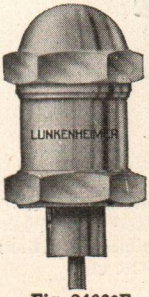


Fig. 24660E

SECTIONAL

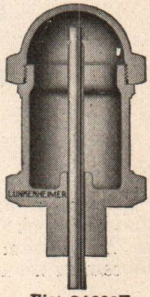


Fig. 24660F

No.	Capacity Ounces	Blank Shank Inches	Price Each Finished Bronze
1½	1½	15/16	1.80
2	2½	15/16	2.00

LUNKENHEIMER OIL CUPS

ROYAL GLASS BODY OIL CUPS

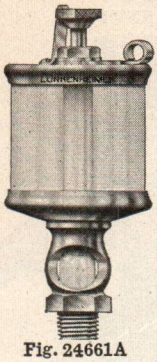


Fig. 24661A

No.	Capacity Ounces	Size Thread Inches	Outside Diam. Inches	Price, Each Fin. Bronze	Price, Each Nickel-plated
000	1/4	1/8	1 3/16	.95	1.05
00	1/2	1/8	1 3/8	1.10	1.20
0	5/8	1/8	1 1/2	1.25	1.40
1	1	1/4	1 3/4	1.50	1.70
1 1/2	1 1/2	1/4	2	1.75	2.00
2	2 1/2	3/8	2 1/4	2.10	2.35
3	4	3/8	2 1/2	2.55	2.85
4	5	3/8	2 3/4	3.15	3.50

PIONEER GLASS BODY OIL CUPS

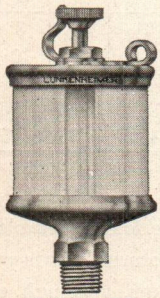


Fig. 24661B

No.	Capacity Ounces	Size Thread Inches	Outside Diam. Inches	Price, Each Fin. Bronze	Price, Each Nickel-plated
000	1/4	1/8	1 3/16	.70	.80
00	1/2	1/8	1 3/8	.75	.85
0	5/8	1/8	1 1/2	.80	.95
1	1	1/4	1 3/4	1.00	1.20
1 1/2	1 1/2	1/4	2	1.25	1.50
2	2 1/2	3/8	2 1/4	1.50	1.75
3	4	3/8	2 1/2	1.90	2.20
4	5	3/8	2 3/4	2.40	2.75

VICTOR GLASS BODY OIL CUPS

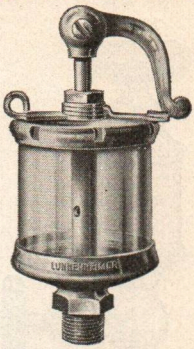


Fig. 24661C

No.	Capacity Ounces	Size Thread Inches	Outside Diam. Inches	Price, Each Fin Bronze	Price, Each Nickel plated
0	5/8	1/8	*1 1/2	1.00	1.15
1	1	1/4	1 3/4	1.20	1.40
1 1/2	1 1/2	1/4	2	1.45	1.70
2	2 1/2	3/8	2 1/4	1.75	2.00
3	4	3/8	2 1/2	2.15	2.45
4	5	3/8	2 3/4	2.70	3.05
5	10	1/2	3 5/16	3.40	3.80
6	18	1/2	3 13/16	4.30	4.80

CROWN GLASS BODY OIL CUPS

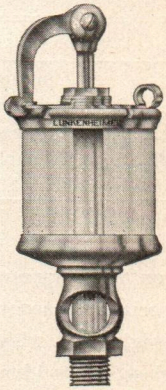


Fig. 24661D

0	5/8	1/8	*1 1/2	1.25	1.40
1	1	1/4	1 3/4	1.50	1.70
1 1/2	1 1/2	1/4	2	1.75	2.00
2	2 1/2	3/8	2 1/4	2.10	2.35
3	4	3/8	2 1/2	2.55	2.85
4	5	3/8	2 3/4	3.15	3.50
5	10	1/2	3 5/16	3.90	4.30
6	18	1/2	3 13/16	4.80	5.30

*Lever included.

LUNKENHEIMER BRONZE LUBRICATORS

No. 498
PLAIN

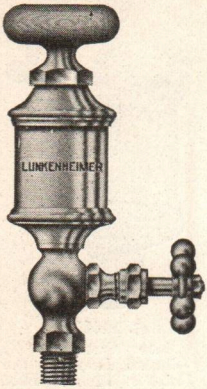


Fig. 8963A

No. 489
"BANNER"

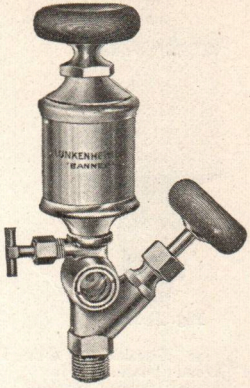


Fig. 8963B

PLAIN

Although a plain lubricator, as its name implies, there is, nevertheless, quite a demand for this design. It is very heavy and made in two parts, the shank being screwed into the cup which is very desirable when subjected to rough usage. The valve in the shank makes it possible to fill the cup while the engine is running.

Number	00	0	1	2	3	4	5	6	7	8
Diameter ..... inches	1	1¼	1½	1¾	2	2¼	2½	3	3½	4
Capacity ..... ounces	¾	1	1¼	1½	2½	4	5	10	18	24
Size, Thread ..... inches	⅜	⅜	⅜	½	½	½	½	¾	¾	¾
Price, No. 498 ..... each	2.00	2.20	2.40	2.60	2.90	3.25	3.75	4.75	7.00	10.00
" " 307 with Cock and Tube "	3.00	3.20	3.40	3.60	3.90	4.25	4.75	5.75	8.00	11.00

"BANNER"

For use on air compressors and blowers, and will also be found suitable for various purposes, especially on account of its simplicity and compactness. It is provided with an improved sight-feed, which is easily replaced when broken, although, owing to the extra thick glass, it is seldom, if ever, that they have to be replaced.

Number	0	1	2	3	4	5	6
Diameter ..... inches	1½	1¾	2	2¼	2½	3	3½
Capacity ..... ounces	1½	2½	3½	4½	6	10	18
Size, Thread ..... inches	⅜	⅜	½	½	½	½	¾
Price, Bronze ..... each	4.40	4.60	5.00	6.00	8.00	10.00	12.00
" Nickel-plated ..... "	5.10	5.60	6.00	7.25	9.50	12.00	14.00
" Extra Sight-Feed Glasses .. per doz.	1.20	1.20	1.20	1.20	1.20	1.20	1.20

LUNKENHEIMER IMPROVED "PARAGON" GLASS BODY SIGHT-FEED LUBRICATORS

No. 553

For Gas, Gasoline or Oil Engines

EXTERIOR

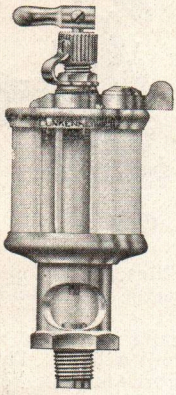
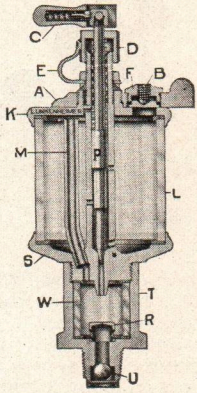


Fig 982A

SECTIONAL



The improved form of the "Paragon" Lubricator will be found to adequately fulfill the requirements of the service for which it has been designed. Its construction has been improved over the other forms heretofore on the market. The construction is very compact, and the general design will, we believe, appeal to users of this class of goods.

The filling arrangement consists of a sliding lid. Referring to the sectional illustration, it will be seen that the slide A screws down on and around the lid of cup, and has a loose plug which covers the filling hole when the slide is swung over to a closed position. This loose plug is so arranged that the wear on same can be taken up by turning down screw B. The whole construction is very heavy, and the slide can be depended upon to seat and remain tight. On account of this construction, it is possible to secure a large filling hole, which, as users know, is a desirable feature.

The feed regulating mechanism is the same as the "Sentinel" Pattern Oil Cup, and the feed can be put on or off by raising or lowering the snap lever C. The rate of feed can be adjusted by turning nut D, which is prevented from loosening by spring E. By this arrangement, the feed can be set and turned on or off without disturbing the rate of flow. The cup is thoroughly packed around the stem, and at the top and bottom of body and sight-feed glasses.

The whole cup is secured together by a patented locking construction which makes it very difficult for the cup to jar apart, due to the shaking of the engine, and also dispenses with the annoyance of oil leaks. The sight-feed glass is large, and can be readily cleaned by unscrewing the upper part of the cup from the base piece.

Capacity.....ounces	1½	2½	4	5	10	18	32
Height of Glass.....inches	1⅝	1⅞	2⅛	2⅜	3	4	5
Diameter of Glass..... "	1¾	2	2¼	2½	3	3½	4¼
Size, Thread..... "	¼	⅜	⅜	⅜	½	½	¾
Price, Finished Bronze.....each	**2.00**	**2.80**	**3.50**	**4.00**	**5.40**	**7.00**	**14.00**
" Nickel-plated ..... "	**2.40**	**3.25**	**4.10**	**4.60**	**6.25**	**8.20**	**16.40**
" Extra Sight-feed Glasses....per dozen	**1.20**	**1.20**	**1.20**	**1.20**	**1.20**	**1.20**	**1.20**

DETROIT IMPROVED STANDARD SIGHT-FEED LUBRICATORS

DOUBLE CONNECTION

EXTERIOR

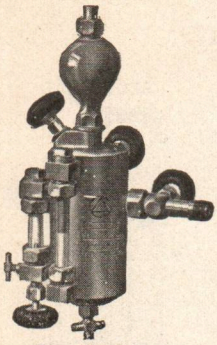


Fig. 5849A

SECTIONAL

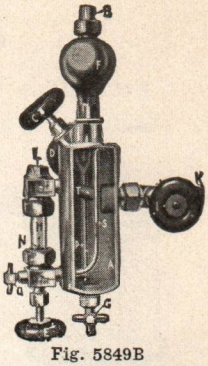


Fig. 5849B

The Detroit Improved Standard Double Connection Lubricator is a quality product throughout. In it are all the essentials of a perfect lubricator combined in a compact and well balanced design.

The support arm is in two parts. The part containing the globe valve is first screwed into the steam pipe and the lubricator is then coupled to it. This makes attachment easy and, on account of the globe valve, the lubricator can be removed at any time for any purpose without letting down steam. The heating passage from the upper sight-feed arm to the support arm passes directly through the body of the lubricator and, being always filled with steam, keeps the oil constantly warm and in a thoroughly liquid condition. This lubricator is well suited for feeding heavy oils.

Capacity.....pints	⅓	½	1	2	4	8
Size of Thread.....inches	½	½	½	½	¾	¾
Sight-Feed Glass ... "	⅝ x 2 1/16	¾ x 3	¾ x 3	¾ x 3¼	¾ x 3¼	¾ x 3¼
Gauge Glass..... "	⅝ x 2 1/16	⅝ x 3¼	⅝ x 4⅜	⅝ x 4⅜	¾ x 6	¾ x 7¾
Price, Finished.....each	.....	.....	.....	.....	.....	.....
" Nickel-plated .. "	.....	.....	.....	.....	.....	.....

SINGLE CONNECTION

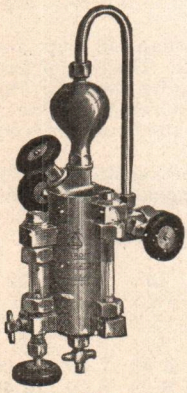


Fig. 5849C

The Detroit Improved Standard Single Connection occupies the same place among single connection lubricators that the double connection holds among double connection lubricators. It has replaced the Style C lubricator.

It is essentially the same as the double connection lubricator, except that it has an equalizing tube made necessary by the single connection.

The support arm is connected to the body at the center of gravity. On this account the connection holds the lubricator very firmly and vibration is reduced to a minimum.

Capacity .....pints	⅓	½	1	2
Size of Thread .....inches	½	½	½	½
Price, Finished .....each	....	....	....	....
" Nickel-plated ... . "	....	....	....	....

Size of glass, sight-feed, for ¼, ⅓ and ½-pint, ¾ x 2⅛ inches; pint and quart sizes same as double connection lubricators.

Prices on application.

DETROIT IMPROVED STANDARD LUBRICATORS

DOUBLE CONNECTION—DUPLICATE PARTS

1-PINT SIZE

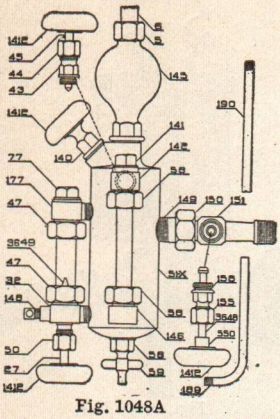


Fig. 1048A

½ AND 1-GALLON SIZE

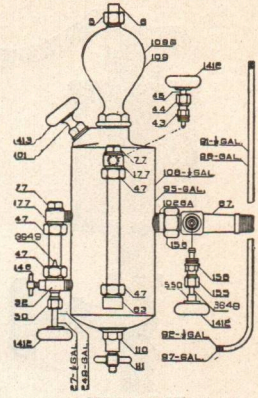


Fig. 1048B

1-PINT SIZE AND UPWARDS

No.	Description	Price Each	No.	Description	Price Each
5	Condenser Tail Pipe Nut....	.15	111	Drain Valve Stem, ½ and 1-gallon	.35
6	" " "	.25	140	Filler Plug, pint and quart...	.40
27	Feed Stem	.25	141	¾ Plug, pint and quart.....	.25
32	Lower Feed Arm	1.00	142	Upper Gauge Arm, pint and quart	.75
43	Water Valve Centerpiece	.25	145	Condenser, 1-pint.....	1.50
44	" " Stem Packing Nut..	.15	146	Lower Gauge Arm, pint and quart	.50
45	" " "	.25	148	Vent Stem	.25
47	Feed Glass Packing Nut	.20	149	Support Arm Tail Piece, pint and quart.	.25
50	" Stem " "	.15	150	Support Arm Tail Pipe Nut.	.15
51X	Body, 1-pint.....	2.50	151	" " pint and quart.	.75
56	Gauge Packing Nut.....	.20	155	Steam Valve Packing Nut...	.15
58	Drain Valve Body	.35	156	" " Centerpiece	.25
59	" " Stem	.25	158	Support Arm Tail Pipe Nut.	.30
71X	Body, 1-quart.....	4.00	177	Upper Gauge and Feed Arms	.75
77	⅞ Plug	.25	189	Oil Tube, 1-pint.....	.25
83	Lower Gauge Arm, ½ and 1-gallon	.50	190	Water Tube, 1-pint.....	.15
87	Support Arm, ½ and 1-gallon	1.00	249	Feed Arm, 1-gallon.....	.25
91	Water Tube, ½-gallon	.15	550	Steam Valve Stem Follower..	.15
92	Oil Tube, ½-gallon.....	.25	1026A	Support Arm Tail Pipe, ½ and 1-gallon	.25
95	Body, 1-gallon	8.00	1412	No. 2 Wood Handle	.15
96	Water Tube, 1-gallon.....	.20	1413	" 3 " "	.15
97	Oil Tube, 1-gallon.....	.30	3648	Steam Valve Stem	.25
101	Filler Plug, ½ and 1-gallon...	.50	3649	Feed Nozzle	.15
105	Condenser, 1-quart.....	2.00	27	Handle Plate.....	.15
106	Water Tube, 1-quart	.15	779	Support Arm Complete.....	1.70
107	Oil Tube, 1-quart.....	.25	2593	Tension Spring (not shown)..	.05
108	Body, ½-gallon	6.00	3771	" Washer " " ..	.05
109	Condenser, ½-gallon	2.75	....	Gauge Glass.....	.10
109G	Condenser, 1-gallon.....	4.00	....	Sight-Feed Glass.....	.10
110	Drain Valve Body, ½ and 1-gallon	.50	....	Gaskets (per dozen).....	.25

In ordering, be sure to give the piece number and name of the part wanted and the serial shop number (stamped on the upper gauge arm of the Improved Standard Lubricators).

HAND CYLINDER OIL PUMPS

LUNKENHEIMER GLASS BODY

ALPHA

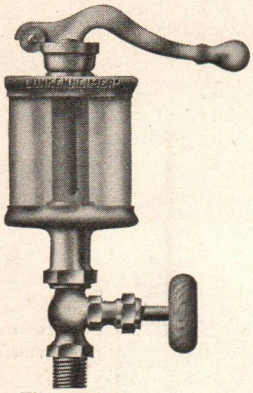


Fig. 25841A

UNIVERSAL

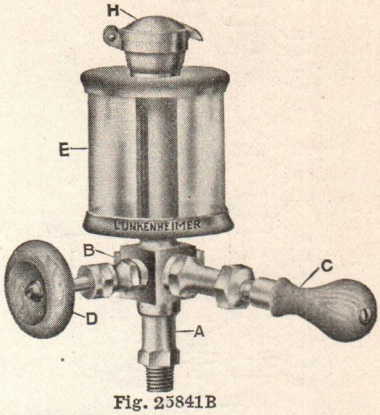


Fig. 25841B

ALPHA OR UNIVERSAL—GLASS BODY

Number, Alpha	3	5	6	8
" Universal	3A	5A	6A	8A
Capacity	⅛ Pint	½ Pint	1 Pint	1 Quart
Diameter of Glass ... inches	2¼	3	3½	4¼
Height of Glass ... "	2⅛	3	4	5
Size of Thread ... "	⅜	⅜	½	½
Price, Finished ... each	**7.50**	**8.50**	**10.00**	**15.00**
" Nickel-plated ... "	**8.25**	**9.50**	**11.00**	**16.50**
" Extra Glasses ... "	**.15**	**.35**	**.65**	**1.50**
" " Washers ... per dozen	**.45**	**.60**	**.75**	**1.50**

UNIVERSAL, BRONZE BODY—Dimensions Same as Glass Body

Number	3A	5A	6A	8A
Price, Finished ... each	**8.30**	**9.50**	**11.00**	**16.50**
" Nickel-plated ... "	**9.10**	**10.30**	**12.20**	**18.20**

Universal oil pumps are equipped with reversible shank, and can be attached either vertically or horizontally.

BRASS BODY

ANGLE NOS. 03, 6, 7

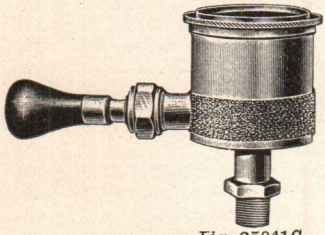


Fig. 25841C

Screw or Strainer Top

⅜-inch Shank Thread

HORIZONTAL No. 3, 04, 4, 5

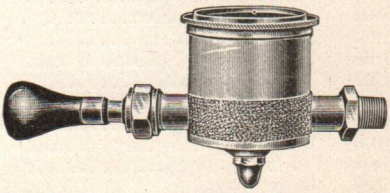


Fig. 25841D

Description	Angle			Horizontal			
Number	03	6	7	3	04	4	5
Capacity ... pints	¼	½	1	¼	½	1	3
Size of Body ... inches	2x2	2¾x2¾	3½x3½	2x2	2¾x2¾	3½x3½	7x4½
Price, Finished ... each	**3.50**	**5.00**	**7.50**	**3.50**	**5.00**	**7.50**	**12.00**
" Nickel-plated. "	**4.00**	**5.50**	**8.00**	**4.00**	**5.50**	**8.00**	**12.75**

OILERS

BENCH OILERS

COPPERIZED STEEL

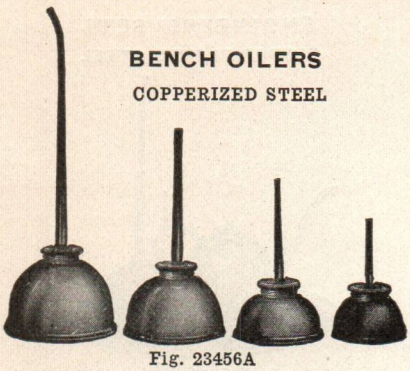


Fig. 23456A

Steel oilers are made from 20-gauge cold-rolled steel with high-grade clock spring steel bottoms. Heavy electro copper-plated inside and out.

BRASS

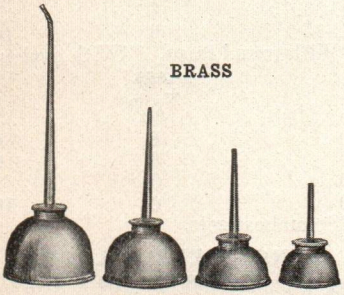


Fig. 23456B

Brass oilers are made of 20-gauge brass, highly polished and lacquered.

Have collar attached to body of can and cap to spout without soldering or brazing. This makes practically solid joints.

Number Steel	Number Brass	Cap. Pints	Spout Inches	Price, per Doz. Steel	Price, per Doz. Brass
12	120	1/4	2 1/2	**4.50**	**6.50**
13	130	1/3	3	**5.50**	**8.00**
13A	130A	1/3	5	**6.00**	**8.75**
14	140	1/3	9	**6.50**	**9.20**
14A	140A	1/2	3	**7.50**	**10.20**
14AA	140AA	1/2	5	**8.00**	**10.75**
14B	140B	1/2	9	**8.50**	**11.20**
15	150	1	3	**9.25**	**12.00**
15A	150A	1	5	**9.75**	**13.00**
16	160	1	9	**10.50**	**14.00**

All oilers can be fitted with spouts 2 1/2 to 18 inches in length. These spouts are interchangeable and will fit other styles of oilers.

INDESTRUCTIBLE PUMP OILERS

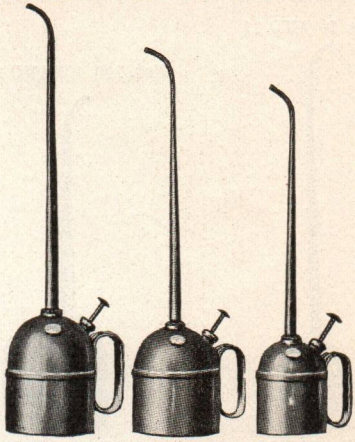


Fig. 23456C

No.	Capacity Pints	Diam. Inches	Spout Inches	Price per Doz.
1000	1	3 3/8	9	**30.00**
2000	1 1/2	3 3/4	12	**40.00**
3000	2	4 1/8	15	**50.00**
4000	4	5	18	**60.00**

AUTO PUMP OILERS

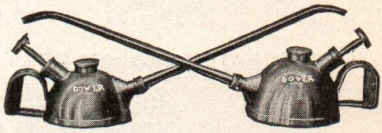


Fig. 23456D

COPPERIZED STEEL

These oilers are especially adapted for automobiles, motor boats, stationary engines, etc. They form a part of the equipment of some of the finest automobiles manufactured in this and foreign countries.

The construction is very simple, but at the same time absolutely positive. It is equipped with the Howland Pump.

Oiler is equipped with a strainer to prevent clogging of the valves and spouts.

No.	Capacity Pints	Diam. Inches	Spout Inches	Price per Doz.
800	1/2	3 3/4	3	**23.00**
801	1/2	3 3/4	5	**23.50**
802	1/2	3 3/4	9	**24.00**
803	1	4 1/4	5	**25.25**
804	1	4 1/4	9	**25.75**

RAILROAD OILERS, ENGINEERS' SETS, ETC.

STEEL RAILROAD OILERS

Nos. 10 AND 11

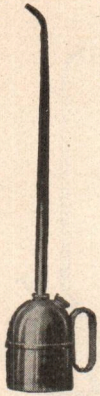


Fig. 23457A

Nos. 100, 101 AND 111

Fig. 23457B

These oilers are drawn seamless in two parts from 20-gauge cold-rolled steel.

No.	Capacity Quarts	Spout Inches	Price per Doz.
10	½	12	**14.00**
11	1	18	**18.00**
100	½	9	**14.00**
101	1	12	**18.00**
111	2	10 or 14	**20.00**

BRASS RAILROAD OILERS

No.	Capacity Quarts	Spout Inches	Price per Doz.
17	½	12	**18.00**
18	1	18	**21.00**
18A	2	10 or 14	**24.00**

STEEL TALLOW POTS

COPPER-PLATED STEEL

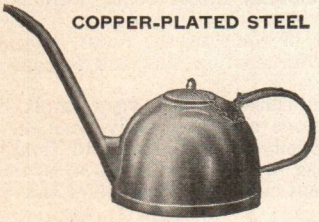


Fig. 23457C

No.	Capacity Quarts	Diam. Inches	Price per Doz.
212	1	5	**21.00**
213	2	6	**25.00**

ENGINEERS' SETS

COPPER-PLATED STEEL

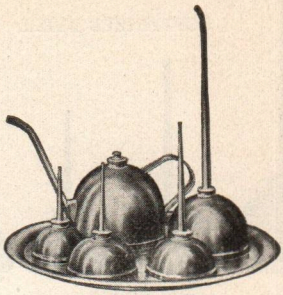


Fig. 23457D

No.	No. in Set	Price Each
*C-30	5	**5.00**
*C-40	6	**7.00**
**C-35	5	**7.00**
**C-45	6	**10.00**

*With round trays. **With oval trays.

BRASS

No.	No. in Set	Price Each
30	5	**6.00**
40	6	**9.00**
*70	5	**7.00**
*80	6	**10.00**

*Steamboat sets.

ENGINEERS' FILLERS

COPPER-PLATED STEEL

Fig. 23457E

No.	Capacity Pints	Diam. Inches	Price per Doz.
19	1	4⅛	**14.00**
19A	1½	4¾	**17.00**
210	2	5	**20.00**
211	4	6	**24.00**

BRASS

No.	Capacity Pints	Diam. Inches	Price per Doz.
170	1	4⅛	**18.00**
190	1½	4¾	**22.00**
200	2	5	**30.00**
201	4	6	**34.00**

PIT CAR OILERS AND PUMP OILERS

PIT CAR OILERS

No. 1

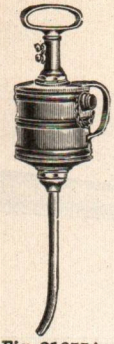


Fig. 21655A

No. 2

Fig. 21655B

No. 3

Fig. 21655C

No. 4

Fig. 21655D

These oilers are designed for range usage. They will operate in any position and discharge a given quantity of oil at one movement of the operating mechanism. The range of the movement is adjustable. No oil can escape except by a movement of the discharge plunger.

No.	Capacity Gallons	Nozzle Inches	Discharge at Each Operation Pints	Price Each
1	½	12	$\frac{1}{20}$ to 1¼	**4.75**
2	¾	5	$\frac{1}{20}$ " 1¼	**5.00**
3	1	5	$\frac{1}{20}$ " 1¼	**6.50**
4	1½	5	¾ " 3½	**7.50**

ENGINEERS' DRIP OILERS

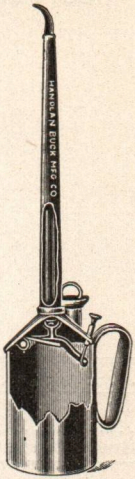


Fig. 21655E

All tin goods made of IXX charcoal plate. Length of spouts in drip oilers, 6, 8, 10, 12, 14, 18, 20, 22 and 24 inches. All spouts 14 inches and over are made double, giving them additional strength.

No.	Capacity Quarts	Price, per Dozen Tin	Brass	Nickeled
34	¼	**8.50**	**12.00**	**15.00**
36	½	**10.00**	**15.00**	**18.00**
38	1	**12.00**	**18.00**	**21.50**
39	2	**14.50**	**21.00**	**26.50**

HAND OILERS

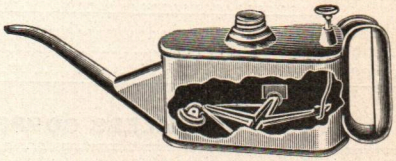


Fig. 21655F

No.	Capacity Quarts	Price, per Dozen Tin	Brass	Nickeled
25	¼	**8.00**	**12.00**	**14.50**
27	½	**9.00**	**13.50**	**17.00**
29	1	**12.00**	**18.00**	**22.50**
31	2	**18.00**	**25.00**	**30.00**

TORCHES AND LAMPS

No. 26

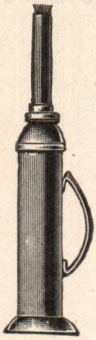


Fig. 655A

COPPER-PLATED STEEL INSPECTORS' AND LOCOMOTIVE TORCHES

Nos. 27 AND 28

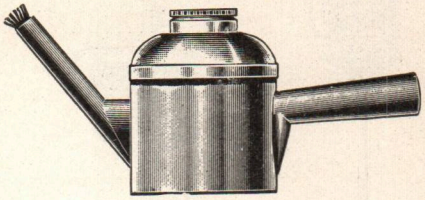


Fig. 655B

Number	26	27	28
Diameter ... inches	2	4⅛	5¼
Height ... "	15	4½	4½
Price, with Brass Cap and Tube ... per dozen	12.00	12.00	15.00

STEEL JACKET LAMP

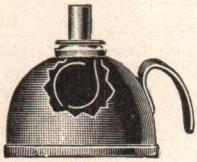


Fig. 655C

SEAMLESS STEEL LAMP

Fig. 655D

MALLEABLE IRON HAND LAMP

Fig. 655E

COPPER-PLATED JACKET LAMPS

Number	20	20½	21
Diameter ... inches	3⅜	3¾	4⅛
Capacity ... pints	5/16	½	1½
Price ... per dozen	6.00	9.00	12.00

SEAMLESS COPPER-PLATED STEEL LAMPS

Number	22	23	24
Diameter ... inches	3¼	4	4⅞
Capacity ... pints	1	1½	2¼
Price ... per dozen	9.00	12.00	15.00

MALLEABLE IRON HAND LAMPS

Price, with Oil Tubes, Kerosene Screw ... per dozen	5.00

GARGOYLE MOBILOILS

GARGOYLE

Mobiloils

GARGOYLE MOBILOIL A

MEDIUM BODY

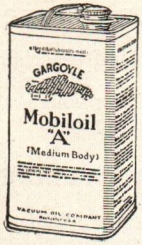


Fig. 30578A

A dark amber-colored oil for lubrication of water-cooled engines requiring a rich lubricant. Also for the motor and enclosed chains of electric vehicles, for motorcycles where a medium-bodied oil is required and for motor boat engines. It holds its body under extreme heat.

GARGOYLE MOBILOIL B

HEAVY BODY

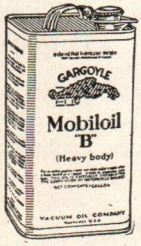


Fig. 30578B

For both air and water-cooled engines where a heavy-bodied oil is required. It holds up compression under extreme heat. This oil is especially suitable for lubrication of motorcycle and tractor engines.

GARGOYLE MOBILOIL E

LIGHT BODY

Fig. 30578C

A straw-colored oil for lubrication of vertical gasoline engines where an oil of light body is required. It flows freely in cold weather; particularly suited to Fords.

GARGOYLE MOBILOIL ARCTIC

LIGHT MEDIUM BODY

Fig. 30578D

A light-colored oil of intermediate body for both summer and winter lubrication of gasoline engines. It flows freely in cold weather.

OILS AND GREASES

GARGOYLE MOBILOIL A, B, E AND ARCTIC

One Gallon Can	Prices upon Request
One-5-Gallon Can, Cased	
Two 5-gallon cans, Cased	
15-gallon Steel Drum with Faucet	
30 " " " " "	
55 " " " " "	
Barrels (Wood)	
Half Barrels (Wood)	

Barrels average 50 to 55 gallons; half barrels average 28 to 30 gallons.

Fig. 30577A

MICA AXLE GREASE

A solid lubricant prepared especially for wagons and like slow speed vehicles. It is also suitable for elevator guides and like places where a durable and moderate adhesive grease is required.

GARGOYLE 600W CYLINDER OIL

A very high-grade steam cylinder oil, prepared especially for cylinder lubrication of large and small steam engines of high and low speeds, employing dry steam from 100 pounds pressure to superheated steam of not over 600 degrees Fahrenheit and loaded to 75 per cent or greater of their rated capacity.

CAPITOL CYLINDER OIL

A high-grade, heavy-bodied steam cylinder oil for the lubrication of large and small engines operating under ordinary conditions.

ACME CYLINDER OIL

A high-class steam cylinder oil, prepared especially for a wide range of operating conditions, including wet steam of low and medium pressures. Suitable for large and small engines of high and low speeds and variable loads.

POLAR MACHINE OIL

A high-grade, pure mineral oil of medium body prepared especially for the lubrication of ammonia compressor cylinders of refrigerating machines, also for bearings of motors and other machines exposed to low temperatures.

UNION THREAD-CUTTING OIL

A compound oil for thread-cutting purposes.

GARGOYLE ARCTIC ENGINE OIL

A high-grade, pure mineral, light-bodied engine oil adapted to the lubrication of bearings of engines of high and low speed, as well as generators and motors exposed to low temperatures.

OILS AND GREASES

ARGON COMPRESSOR OIL

A heavy-bodied, high-grade, pure mineral oil especially designed for cylinder lubrication of single-stage high air pressure compressors, subject to heavy duty and high air temperatures.

ARIO COMPRESSOR OIL

A high-grade, medium-bodied, pure mineral oil especially designed for two-stage air compressor cylinders that are not subject to severe duty, and when maximum air pressure does not exceed 125 pounds per square inch.

STANDARD AIR COMPRESSOR OIL

A high-grade, light-bodied, pure mineral oil suitable for cylinder lubrication of small air compressors and for medium single-stage air compressors not subject to heavy duty and high discharge temperatures.

SUMMER BLACK OIL

A heavy-bodied, dark-colored oil for summer use on mine pitcar journals, grading machine bearings, tractor bearings and machinery of like character.

WINTER BLACK OIL

A dark oil, lighter bodied than Summer Black Oil, intended for winter use on like machine journals.

STANDARD GAS ENGINE OIL

An oil especially prepared for the lubrication of cylinders of stationary gas engines, also for tractor engines using gasoline for fuel.

RENOWN ENGINE OIL

A high-grade, light-bodied, pure mineral oil well adapted for bearings of high and low speed engines, also for generators and motors not exposed to extreme low temperatures.

ATLANTIC RED ENGINE OIL

A pure mineral engine oil of medium body suitable for general lubrication of bearings of engines, generators, motors, shafting and other machinery of moderate speeds exposed to comfortable room or surrounding temperatures.

JUNIOR RED ENGINE OIL

This is a more fluid pure mineral engine oil than Atlantic Red, suitable for general use on oil-lubricated bearings.

ARCTIC CUP GREASE

Arctic Cup Grease is manufactured in various consistencies ranging from No. 0 to No. 5. Used on ordinary grease lubricated bearings or those either designed or equipped for grease lubrication rather than fluid oil lubrication.

Nos. 0, 1 and 2 are suitable for feeding either from grease reservoirs or from pin cups. Nos. 3, 4 and 5 are well adapted for screw compression cups. No. 3 is best adapted for feeding from spring compression cups.

POLARINE CUP GREASE

A solid lubricant especially prepared for automobile and truck service. Used in grease cups, ball and roller bearings, differentials and universal joints.

POLARINE OILS AND GREASES

POLARINE OIL

Fig. 30773A

POLARINE CUP GREASE

Fig. 30773B

POLARINE MEDIUM OIL

A rich, mahogany-colored petroleum oil used for the lubrication of water-cooled internal combustion engines used for power purposes in passenger automobiles and motor trucks. An ideal oil for both summer and winter lubrication. It flows freely at cold low temperatures.

POLARINE HEAVY OIL

A rich, dark-mahogany-colored oil used in heavy duty water-cooled internal combustion engines which require a heavier-bodied oil than the medium. It is ideal for heavy trucks and light tractors.

POLARINE EXTRA HEAVY OIL

This is a very heavy-bodied petroleum oil and is used for lubrication of internal combustion engines working under severe loads and severe heats. This oil is ideal for the lubrication of heavy duty traction engines and air-cooled motorcycles.

POLARINE CUP GREASE

A solid lubricant for use in grease cups and on ball and roller bearings. May also be used in universal joints, and in warm weather in differentials, etc.

Put up in 5, 10 and 25-pound lithographed cans, also in barrels and half barrels.

POLARINE OILS IN BARRELS

Polarine is sold in iron and wood barrels, also in cases of Twelve ½-gallon cans; six 1-gallon cans; one 5-gallon can and two 5-gallon cans.

WASTE, OAKUM, ETC.

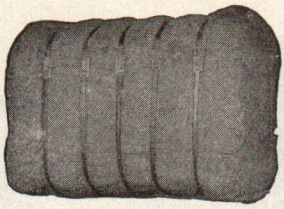


Fig. 12265A

WHITE COTTON WASTE

Number	1	2	3
Price ..... per pound	.....	.....	.....

COLORED COTTON WASTE

Number	1	2	3
Price ..... per pound	.....	.....	.....

WOOL WASTE

Price, Colored ..... per pound .....

OAKUM

Fig. 12265B

Price, Navy, 50-pound Bales	per bale	.....
" Plumbers', 50-pound Bales	"	.....
" Rope Oakum	"	.....

FRICTION BOARD

Number	3	4	5	6	7	8	9	10
Thickness ..... inches	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10
Size of Boards, Davy Board "	33x44	33x44	33x44	33x44	33x44	33x44	33x44	33x44
" " " Granite " "	.....	35x42	35x42	35x42	.....	35x42	.....	35x42
Number of Boards to Bundle	3	4	5	6	7	8	9	10
Weight, per Bundle ..... *pounds	50	50	50	50	50	50	50	50

*Approximately.

CROSS OIL FILTERS

EXTERIOR

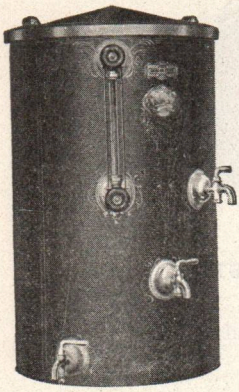
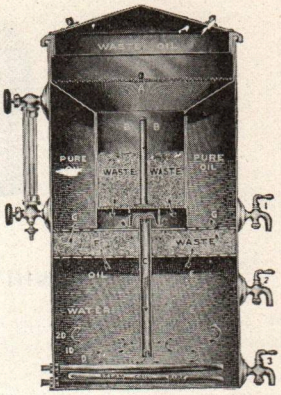


Fig. 18400A

SECTIONAL



Recommended for filtering engine and common machinery oils. For cleaning lard, cylinder, gas engine, and heavy oils, the Burt Unit Oil Filter and the American Oil Filter are recommended.

Nos. 1, 2 and 3 sizes are made as shown in the sectional view on this page. No. 4 and larger sizes without connection for oiling system.

Very little steam (exhaust) is required, and if the filter is kept in a warm place it will not be necessary to make steam connections. The object of using heat is to increase the speed and capacity of the filter.

STYLE A

Where lubricating oil is used in very large quantities it is desirable, in the interest of economy, to make pipe connections by means of gate valves so that the filtered oil can be pumped to any part of the plant desired. For this purpose Style A is recommended. Also recommended for use with oiling systems.

STYLE B

In many power plants water becomes mixed with the waste lubricating oil, and considerable difficulty is often experienced in filtering this mixture. Style B is not only recommended, but guaranteed to separate water automatically from the waste oil and at the same time to clean the oil so that it can be used over and over again.

Style B Filter will also take the condensed water and oil from oil separators and exhaust heads and successfully separate the oil from the water and filter the oil perfectly, so that it (the reclaimed cylinder oil) will make an excellent lubricant for pumps and other machinery.

Number	1	2	3
*Filtering Cap. gal.	20 to 30	5 to 10	40 to 50
Dirty Oil " "	7	3	17
Pure " " "	11	3	20
Diam. Cross in.	18	12	24
" Style A "	18	..	24
" " B "	25	18	31
Price, Cross each	**30.00**	**20.00**	**60.00**
" Style A "	**35.00**	.....	**65.00**
" " B "	**40.00**	**25.00**	**70.00**
Number	4	5	6
*Filtering Cap. gal.	60 to 70	70 to 90	100 to 120
Dirty Oil " "	26	32	45
Pure " " "	37	49	60
Diam., Cross in.	30	33	35
" Style A "	30	33	35
" " B "	37	40	42
Price, Cross each	**75.00**	**90.00**	**110.00**
" Style A "	**80.00**	**95.00**	**110.00**
" " B "	**90.00**	**110.00**	**130.00**
Number	7	8	.....
*Filtering Cap. gal.	120 to 150	150 to 200	.....
Dirty Oil " "	52	57	.....
Pure " " "	75	90	.....
Diam., Cross in.	35	40	.....
" Style A "	35	40	.....
" " B "	42	47	.....
Price, Cross each	**130.00**	**165.00**	.....
" Style A "	**130.00**	**165.00**	.....
" " B "	**150.00**	**180.00**	.....

*Per day of 24 hours.

U. S. GRAPHITE PRODUCTS

PIPE CEMENT

Fig. 24811A

Used by engineers, plumbers, gas and steam fitters for dry or steam pipe joints, gaskets, stay bolts, etc. This is a compound suited to all kinds of joints, threaded or flanged, having for its base pure Mexican graphite which is wholly unaffected by water, heat, cold or chemical action of any nature.

Style of Package..	Can	Pail	Pail	Pail
Weight...pounds	1	5	12½	25
Price.....per lb.	.27	.25	.23	.22
Style of Package..	Pail	½ Bbl.	Bbl.	...
Weight...pounds	100	350	600	...
Price.....per lb.	.21	.19	.18	...

FRONT END LUSTRE

Fig. 24811B

This luster affords a bright, glossy finish, is easily and quickly applied and durable. Made from pure air-floated Mexican graphite, it is unaffected by any of the trying conditions, climatic or otherwise, to which a locomotive front end is exposed.

Style of Package....	Pail	Pail	Tin
Capacity.....gallons	½	1	5
Price.....per gallon	1.95	1.90	1.80
Style of Package....	½ Bbl.	Bbl.	....
Capacity.....gallons	30	52	....
Price.....per gallon	1.65	1.60	....

MEXICAN GRAPHITE PAINT

Fig. 24811C

Made from pure air-floated Mexican graphite ground in linseed oil of the best quality, unaffected by smoke, water, brine, acids, alkali, extreme temperatures, steam, moisture, sulphur fumes, or, in fact, by any chemical or climatic conditions.

For structural iron and steel, steam pipes, coils, roofs, etc.

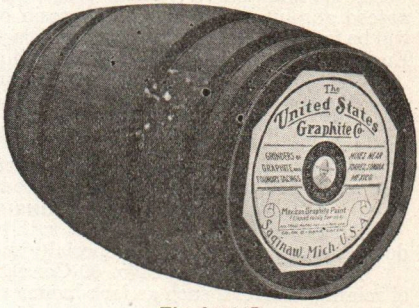


Fig. 24811D

Under ordinary weather conditions, covering power per gallon is approximately 1000 square feet of smooth or new metal surfaces, 750 square feet on rough, scaly or rusty metal surfaces, and 400 square feet on dressed lumber or old painted wood.

READY FOR USE

Style of Package	Price, per Gallon *A	**B	†C	§D	‖E
Barrel	2.60	3.10	3.00	2.70	3.10
½ Bbl.....	2.70	3.20	3.10	2.80	3.20
5-gal. Can...	2.85	3.35	3.25	2.95	3.35
1 " " ...	2.95	3.45	3.35	3.05	3.45
½ " " ...	3.10	3.60	3.50	3.15	3.60

PASTE FORM

Style of Package	Price, per Pound *A	**B	†C	§D	‖E
Barrel ..	.18½	.28	.25	.21	.28
½ Bbl...	.19	.28½	.25½	.21½	.28½
Keg	.19½	.29	.26	.22	.29
25 lb. Pail	.20½	.29½	.26½	.22½	.29½
12½ " "	.21	.30	.27	.23	.30
5 " "	.21½	.30½	.27½	.23½	.30½

Colors: *Natural. **Dark green. †Jet black. §Dark brown. ‖Red.

MINING MACHINERY LUBRICANT AND BOILER GRAPHITE

MINING MACHINERY LUBRICANT

Fig. 30845A

Mining Machinery Lubricant is unaffected by temperature changes, not removed by water and maintains a frictionless film on the bearing surfaces under all conditions. Guaranteed absolutely free from acid, rosin or other injurious ingredients of any nature, and will be found to afford better and more lasting lubrication than straight oils or other greases. Endorsed and recommended by the leading manufacturers of mining machinery.

NO. 00 CONSISTENCY, NON-FLUID

Prepared expressly for the lubrication of all types of mining machines, such as jack-hammers, rotators, leyner and rock drills, cutting chains and for hand oiling on continuous coal cutting machines.

It is also prepared in No. 1 Consistency, Non-Fluid, and recommended for use where a somewhat heavier lubricant is required.

NO. 1 CONSISTENCY, NON-FLUID

An extra fine quality of grease with high melting point recommended for use in screw-down or compression cups. Especially suited for cups of cutting machines.

It is also prepared in No. 00 Consistency, Semi-Fluid, for the lubrication of all types of mining machines such as jack-hammers, rotators, leyner and rock drills, cutting chains and for hand oiling on continuous coal cutting machines.

Price, 25-pound Tin Cans, 2 in a Case	per can	**6.75**
" Kegs, about 120 Pounds	per pound	**.22**
" Half Barrels, about 200 Pounds	"	**.21**
" Barrels, about 400 Pounds	"	**.20**

MEXICAN BOILER GRAPHITE

Fig. 30845B

Breaks down old hard scale and prevents further hard formation—works mechanically, not chemically, and does not harm the boiler. Does not cause foaming and cannot be carried over with steam—a sure, safe, thorough and economical scale remedy.

Style of Package	Keg	Barrel
Weight ... pounds	100	400
Price ... per pound	**.14**	**.10**

CUP, CABLE AND GEAR GREASE

CUP GREASE

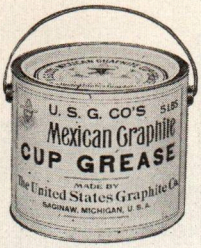


Fig. 13813A

CABLE GREASE

Fig. 13813B

JOURNAL AND GEAR GREASE

Fig. 13813C

U. S. G. CO.'S MEXICAN GRAPHITE CUP GREASE

Contains no animal matter, acids, resin or other injurious ingredients, and is made in four consistencies—(1) Extra Soft, which is about like non-fluid oil and suited for rapid running machinery or bearings which must be reached by means of a tube or squirt can; also for enclosed transmissions, sliding gears, etc. (2) Soft. For general use on crank pins, crossheads, slides, eccentrics, pillow blocks, main journals, etc. (3) Medium. Higher melting point than Soft. For use in screw or compression cups and on open bearings where aperture is moderately large. (4) Hard. For screw or compression cups, heavy open bearings and places where high melting point is essential.

Price,	1-pound Friction-top Tin Cans, 36 in a Case	per can	.35
"	5 " " " " Pails, 12 " " "	per pail	1.50
"	10 " " " " " 6 " " "	"	2.75
"	25 " Tin Cans, 2 in a Case	per can	6.00
"	Kegs, about 125 pounds	per pound	.22
"	Half-barrels, about 200 pounds	"	.21
"	Barrels, about 400 pounds	"	.20

U. S. G. CO.'S MEXICAN GRAPHITE CABLE GREASE

Mexican Graphite is very adhesive. It is not removed by rain or running water, and after a short period of continuous use the graphite in this grease imparts to wire ropes or cables a smooth waterproof surface, thus saving considerable power, reducing wear and preventing cutting or corrosion.

U. S. G. CO.'S MEXICAN GRAPHITE JOURNAL AND GEAR GREASE

Made in three consistencies, hard, medium and soft, for the lubrication of journals, gears, etc. Will not gum, harden or dry up. Not affected by heat or cold and therefore usable in any climate.

Price,	5-pound Tin Pails, 12 in a Case	per pail	1.25
"	10 " " " 6 " " "	"	2.20
"	25 " " Cans, 2 " " "	per can	4.50
"	Kegs, about 140 pounds	per pound	.13
"	½ Barrels about 250 pounds	"	.12½
"	Barrels about 450 pounds	"	.12

Above prices apply to U. S. G. Co.'s Mexican Graphite Cable Grease, U. S. G. Co.'s Mexican Graphite Journal and Gear Grease.

LUBRICANTS

U. S. LUBRICATING GRAPHITE

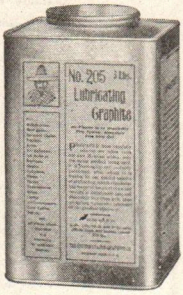


Fig. 23063A

An air-floated powder of impalpable fineness, soft, adhesive and gritless.

It is a preventative and cure for hot pins, hot boxes, and cylinders. It is especially efficient in gas engine cylinders where, besides minimizing carbonization, it assures better compression and more power with less gasoline.

Mix with oil in the proportion of about 1 teaspoonful to the pint; with grease use about 1 ounce or 2 teaspoonfuls to the pound, always mix thoroughly. The dry powder may be introduced within gas engine cylinders by holding a small quantity, about ½ teaspoonful, at the cold air intake of carburetor while engine is in motion.

One user of No. 205 says: "A small quantity of the powdered graphite was blown into each cylinder every few days by removing the valve caps, and by its use I was able to decrease the amount of cylinder oil and so avoid the carbonization of cylinders and valves which had previously troubled me greatly. I also mixed some with lubricating oil and found it very satisfactory for all bearings."

Price, ½-pound Screw-top Cans, 36 in a Case . . . . . per can	.30
Price, 1-pound Screw-top Cans, 36 in a Case . . . . . per can	.40
Price, 5-pound Screw-top Cans, 12 in a Case . . . . . per can	1.90
Price, 10-pound Screw-top Cans, 6 in a case . . . . . per can	3.50
Price, 25-pound Screw-top Cans, 2 in a Case . . . . . per can	8.00
Price, 100-pound Kegs . . per pound	.30
" Barrels, about 350 Pounds, ... per pound	.28

DIXON'S FLAKE GRAPHITE

Fig. 23063B

Dixon's Flake Graphite has many valuable applications as a lubricant for cylinders, valves and bearings, either alone or mixed with oils and greases. It is also valuable to engineers and mechanics for coating gaskets and packing, for pipe fittings, etc.

It is prepared in the coarser or No. 1 flake, and the finer or No. 2 size.

If the finely ground graphite is desired, so specify in the order. Prices same for Nos. 1 and 2.

Price, 1-pound Paper Cans, 36 in a Case . . . . . per can	.45
Price, 5-pound Tin Cans, Screw-top, 10 in a Case. . . . . per can	2.00
Price, 10-pound Tin Cans, Screw-top, 5 in a Case . . . . . per can	3.75
Price, 25-pound Paper Bags, Enclosed in Case . . . . . per bag	8.75
Price, 50-pound Paper Bags, Enclosed in Case . . . . . per bag	16.50
Price, 100-pound Kegs. . . . per keg	32.00
" 200 " " . . . "	62.00
" 400 " Barrels . . per bbl.	120.00

OILS, GREASES, ETC.

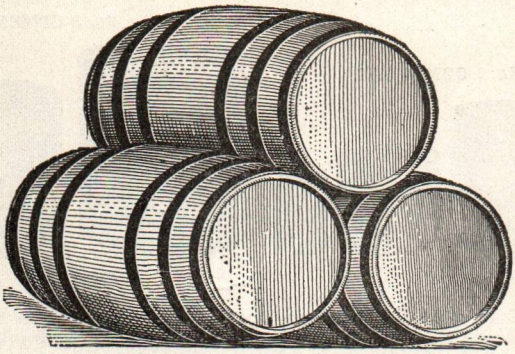


Fig. 8250A

OILS, ETC.

Price,	Climax Red Engine Oil, for Light Bearings, Shafting, and for General Use....	per gallon	.....
"	Special Castor Machine Oil, for General Use and Agricultural Machinery....	"	.....
"	Pure Winter Strained Lard Oil.....	"	.....
"	Climax Cylinder Oil	"	.....
"	Black Diamond Cylinder Oil.....	"	.....
"	Black Oil, for Cars, Heavy Bearings, etc.	"	.....
"	Gasoline Engine Oil, for Cylinders of Gasoline Engines, Automobiles, etc.....	"	.....
"	Cup Grease, for Oil and Grease Cups.....	"	.....
"	Boiler Compounds.....	"	.....

Prices on application.

ALBANY GREASE

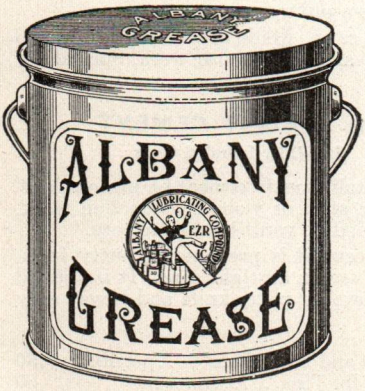


Fig. 8250B

Albany lubricating compound, is all lubricant, no waste—and is made in seven different consistencies.

No. 0 is very soft, being used in extremely cold weather, and on exposed journals.

No. 1 is harder than No. 0, and is used on ordinary journals in cold weather, or on very cool or slow running journals, also elevator slides.

No. 2 is harder than No. 1, and is known as winter grease, ordinarily used in moderate and warm weather.

No. 3 is adapted to the use of all stationary, marine and tug boat engines, also shafting, dynamos, general electrical and high speed machinery in warm weather, and is known as summer grease.

No. X, XX or XXX are heavy bodied greases which will lubricate journals with entire satisfaction where temperatures are high. Never fails in severe cases to overcome all lubricating difficulties.

Package.....	1 lb. Can	5 and 10 lb. Cans	25 and 50 lb. Cans	125 lb. Kegs	200 lb. Half Bbls.	400 lb. Bbls.
Price..... per pound	.35	.30	.28	.19	.18	.17

SMOOTH-ON

No. 1 AND No. 2 COMPOUND

Fig. 9911A

No. 3 CEMENT

Fig. 9911B

No. 1 and No. 2, in blue labeled cans. Prepared in powder form for repairing leaks or breaks in castings and for making connections in steam or hydraulic work. No. 1 is quick hardening, No. 2 slow hardening, and hydraulic. Applied as a paste or putty.

No. 3 Elastic Cement, in gray labeled cans. Especially prepared in paste form, for use on all seams of boilers or tanks to stop leaks, also for boiler patching and for screw thread joints. Applied as a paint, paste or putty to hot or cold metal.

No. 4 CASTINGS

Fig. 9911C

No. 5 CALKING CEMENT

Fig. 9911D

No. 4 Castings, in yellow labeled cans. This is an iron cement made in powder form for repairing blemishes, blowholes or defects in iron or steel castings. Made in two grades A, for fine castings; B, for coarse castings. Applied as a putty.

No. 5 Calking Cement for plumbers, in red labeled cans. Made in powder form in two strengths—Regular and Special—Regular for soil pipe and greenhouse work, Special for water and gas main joints for high pressure.

Fig. 9911E

No. 6 RIVET CEMENT

In White Labeled Cans

A metallic putty cement for use on ships' sides, iron, steel or wood construction work, metal skylights, vault lights, etc., etc.

This cement is prepared in putty form, ready for use, in air-tight cans. It is applied with a trowel or putty knife and is very easy to work.

Price,	Smooth-On	Iron Cement Nos. 1 and 2 in 1, 5, 10 and 25-lb. Tins.....per lb.			.50
"	"	"	Elastic Cement No. 3 in 1, 5, and 10-lb. Tins.....	"	.50
"	"	"	Castings No. 4, Grades A and B, in 1, 5, 10 and 25-lb. Tins.	"	.50
"	"	"	Joints No. 5 in 1, 5, 10 and 25-lb. Tins.....	"	.50
"	"	"	Rivet Iron Cement No. 6 in 1, 5 and 10-lb. Cans.....	"	.50

Discounts quoted on all the above on any specified quantity

NORTON PRODUCTS

ALUNDUM AND CRYSTOLON GRAIN FOR POLISHING

Fig. 23971A

The widely extended use of Alundum and Crystolon grain is due in a large measure to two marked points of superiority—the perfection of the materials themselves as abrasives, and the extreme care used in the manufacture together with the preparation of the grain for all grinding and polishing purposes.

Alundum grain is used extensively for polishing on nearly every class of work, but is most highly efficient on steel and other materials of high tensile strength.

Crystolon, the trade name for Norton carbide of silicon, ranks next in hardness to the diamond. Its characteristic property of brittleness makes it highly efficient for polishing and grinding such metals as cast iron, chilled iron and brass, and such materials as marble, granite and pearl. In general, all materials possessing low tensile strength.

ALUNDUM

Nos. 10 TO FFFF, INCLUSIVE

Quantity	Per Lb.	Quantity	Per Lb.
Ton Lots	.....	Small Kegs, 100 pounds	.....
Single Kegs, 350 pounds	.....	Less Quantities	.....

Nos. 10 TO XF

Size, Can	Per Lb.	Size, Can	Per Lb.
One-pound	.....	Five-pound	.....
Three-pound	.....	.....	.....

Nos. 65C AND 65F

One-pound	.....	Five-pound	.....
Three-pound	.....	.....	.....

No. XF

Price, 10 pounds or Over ..... per pound .....

Nos. 65C AND 65F

Price, 10 pounds or Over ..... per pound .....

CRYSTOLON

Nos. 10 TO XF, INCLUSIVE

Quantity	Per Lb.	Quantity	Per Lb.
150 to 300-pound Kegs	.....	10 to 49 pounds	.....
50 " 100-pounds	.....	.....	.....

Nos. 10 TO XF IN TIN CANS

Size, Can	Per Lb.	Size, Can	Per Lb.
One-pound	.....	Five-pound	.....
Three pound	.....	.....	.....

Nos. 65C AND 65F

Price, 10 pounds or Over ..... per pound .....
" less Quantity ..... " .....

Prices upon application.

MAGNOLIA METAL AND BUSHINGS

Fig. 17853A

This metal has the least frictional resistance of any known babbitt metal, absorbs less power, wears longer, runs cooler, requires less lubrication, saves fuel, metal and cost of rebabbitting. Stands heavy pressures and high speeds and is not apparently affected by dust and grit. Will not cut, score or seize the shaft.

Magnolia is in every respect a high-grade, economical metal for lining all machinery bearings, also for metallic rod and stem packing and for piston bull rings.

CORED BARS FOR BUSHINGS

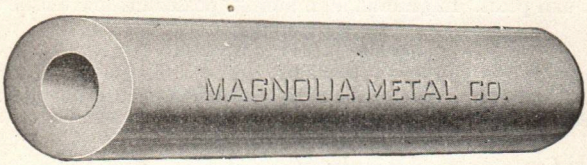


Fig. 17853B

Supplied in bars twelve inches in length.

Diameter of Bars	inches	3	2½	2⅜	2¼
" " Cores	"	1½	1¼	1⅛	1
Weight of Bars (Magnolia)	pounds	22¼	15½	14½	13½

Can furnish cored bars made of Magnolia Metal or Adamant — a high-grade tin base metal or special formulas at a slight advance over metals in ingot form—cored bars are very handy around machine and repair shops for expediting work and saving cost of patterns and casting for small bearings; particularly for crank shaft bearings of small gasoline engines etc.

As this is first run metal from the kettles, the mixture is absolutely homogeneous which assures maximum results; the bearings fit snugly and will not work loose from shrinkage as cast bearings often do, nor cut or seize the shaft.

Prices on application.

ULCO HARD METAL

Fig. 30780A

Ulco Hard Metal is of comparatively high tensile strength, with relative immunity to corrosion, and can be used in place of high-grade alloys, such as are made of nickel, copper, bronze, tin, etc. As the cost of Ulco Hard Metal is considerably less than these alloys, it has a decided economic value. It can also be used to advantage in the place of many lower-grade metals, because of its superior service qualities. It can displace brass for many purposes where the high tensile strength of brass is not an important factor.

The development of Ulco Hard Metal as a bearing metal has been very rapid and it is now extensively used for all classes of bearings. Its minimum frictional resistance, hardness and great compressive strength are qualities which insure satisfactory bearing results. It is less subject to cracking and not so likely to score shafts as other babbitt metals. It is more plastic than tin base metals and reduces the liability to wear, which occurs when tin base metals are overheated. Under working conditions, it will gradually develop a fibrous structure and will take a very high polish under the revolving action of the shaft and lubricant. Although not of a Brinnell point of hardness as high as some tin base metals, it will answer the same purpose and stand a great deal more abuse through lack of lubricant or similar operating neglects.

Tests have shown that the consumption of oil on Ulco bearings is uniformly less than other babbitt metals. This should increase its value materially, particularly for agricultural implements, it being a well-known fact that this class of machinery is probably more neglected than any other equipment requiring lubrication.

At a test made in a 650 horse power Corliss engine 120 revolutions per minute with diameter of shaft 14 inches, length of bearing 22 inches, projected pressure per square inch 590 pounds, with a babbitt metal bearing composed of 80 per cent tin, 15 per cent antimony, 5 per cent copper, with a Brinnell point of 31, and an ultimate strength of 12,500 pounds, there was an oil consumption of 3 quarts per 24 hours. *Ulco Hard Metal* displaced this bearing with an *oil consumption of* 2 *quarts per* 24 *hours.*

Pouring practice of Ulco Hard Metal is not different from the standard pouring of any other bearing metal. It will not materially lose its hardness or other physical properties at temperatures between 700 and 1200 degrees Fahrenheit. Ordinary tin base metals will crumble at these high temperatures.

Ulco Hard Metal is peculiarly adapted for use as die casting metal. It can also be cast in moulds or sand with excellent results and used as a substitute for castings of copper, bronze, etc. It has a perfect fluidity at a comparatively low temperature, insuring castings that are smooth and perfect.

SPECIALTIES—Ulco Hard Metal is used in the manufacture of plumbing specialties, such as bath and basin supply pipes, traps, etc. It is also finding a use in the manufacture of various products, such as steam packings, carriage body mouldings, hammers, washers, sleeves, etc.

Furnished in 80 and 100-pound pigs, also in 10-pound ingots, packed in boxes containing approximately

Prices and further information furnished upon application.

METALS

PIG LEAD

Fig. 1030A
Pigs weigh about 100 pounds.

CALKING LEAD

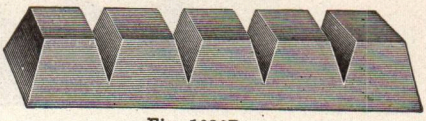


Fig. 1030B

PIG TIN

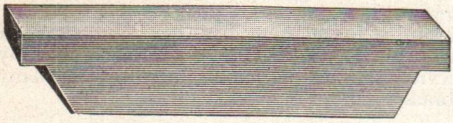


Fig. 1030C
Banca and Straights; pigs weigh about 100 lbs.

BAR TIN

Fig. 1030D
In 500-pound cases.

WIPING SOLDER

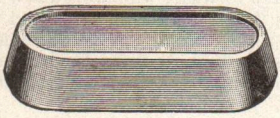


Fig. 1030E

HALF AND HALF SOLDER

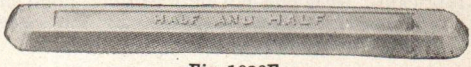


Fig. 1030F
Furnished in Warranted and Commercial brands

WIRE SOLDER

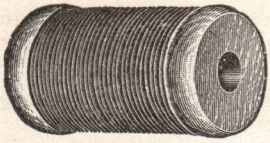


Fig. 1030G
Furnished in Half and Half.

SPELTER SOLDER

Fig. 1030H
Fine and Coarse.

SILVER SOLDER

Fig. 1030J
Furnished in sheets 7/8x48 in.

COPPER INGOTS

Fig. 1030K
In ingots, 15 to 20 pounds.

ANTIMONY

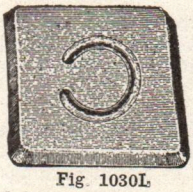


Fig. 1030L
In slabs, 35 to 40 pounds.

SPELTER OR ZINC

Fig. 1030M

Aluminum Bronze Phosphor Tin Nickel Bismuth Sheet Zinc

Prices on Application

POTS, LADLES AND JOINT RUNNERS

SOLDER POT

Fig. 23065A

POURING POT

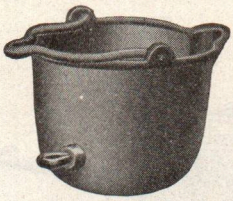


Fig. 23065B

SOLDER POTS

Size.....inches	4	5	6	7	8	9	10	12	13½
Price.....each	.35	.40	.70	.95	1.20	1.35	1.80	3.20	4.00

POURING POTS

Size.....inches	8	10	12
Price.....each	4.00	5.00	6.00

MELTING LADLE

Fig. 23065C

JOINT RUNNER

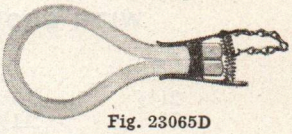


Fig. 23065D

PRESSED PLATE STEEL MELTING LADLES

Extra deep, extra thick, welded handle, extra long, these 2½ to 6-inch diameter ladles are 50 per cent, and the 7 to 14-inch diameter are 25 per cent deeper and thicker and have longer handles than the ordinary ladles.

Diam. of Bowl Inches	Depth of Bowl Inches	Capacity Pints	Capacity Pounds	Thickness of Bowl Inches	Length of Handle Inches	Size of Handle Inches	Price, Each Complete	Price, Each Bowl only
2½	1⅜	⅛	1	7/64	16	⅛x¾	.33	.13
3	1½	¼	2	7/64	17	3/16x⅞	.45	.18
4	2	½	5	⅛	18	3/16x⅞	.60	.24
5	2½	1	11	⅛	26	*7/16	.84	.34
6	3¼	2	23	11/64	29	*½	1.56	.62
7	3⅝	3	35	3/16	30	*9/16	1.89	.76
8	4	5	59	7/32	33	*9/16	2.37	.95
9	4¼	9	106	7/32	35	*⅝	3.15	1.26
10	4¾	12	141	¼	40	*¾	3.78	1.51
11	5 5/16	13½	159	5/16	40	*¾	4.20	1.68
12	6	16	188	5/16	42	*¾	4.80	1.92
14	6⅞	30	354	5/16	44	*¾	5.40	2.16

*Round.

IMPROVED JOINT RUNNERS

SQUARE ASBESTOS

Size No.	For Pipe Inches	Price Each	Size No.	For Pipe Inches	Price Each
1	2, 3 and 4	2.70	6	24	13.20
2	4, 5 " 6	3.00	7	30	14.50
3	6, 8 " 10	5.10	8	36	16.50
4	10, 12 " 14	6.00	9	42	18.00
5	16, 18 " 20	12.00	10	48	19.50

LEAD AND BABBITT MELTING FURNACES

WITH DOOR, ON WHEELS

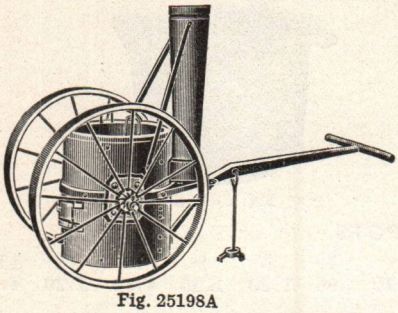


Fig. 25198A

WITHOUT DOOR, ON WHEELS

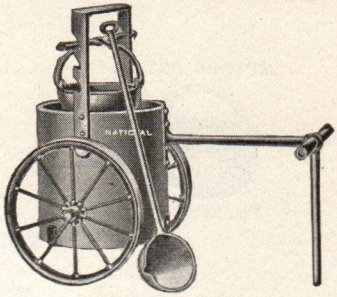


Fig. 25198B

WITH DOOR, ON WHEELS

No.	Diam. Inches	Size Pot Inches	Capacity Pounds	Price, Each With Rack	Price, Each Without Rack
No. 1	21½	16¾x11	700	77.00	70.00
" 2	16	11½x 8	260	70.00	63.00

WITH DOOR, ON LEGS (NOT SHOWN)

No.	Diam. Inches	Size Pot Inches	Capacity Pounds	Price, Each With Smokestack	Price, Each Without Smokestack
No. 1	21½	15½x10½	600	52.00	49.00
" 2	16	11½x 8	260	45.00	42.00

WITHOUT DOOR

No.	Diam. Inches	Size Pot Inches	Capacity Pounds	Price, Each On Wheels	Price, Each On Legs
No. 1	24	15	450	70.00	60.00
" 2	18	13¾	200	60.00	50.00

BABBITT MELTING FURNACES

No. 1

Fig. 25193C

No. 2

Fig. 25198D

This babbitt melting furnace is designed to be placed on a bench or stand and should be connected permanently with the gas line. The air and gas are admitted from opposite sides and enter a common mixing chamber, where they are thoroughly united and thus form perfect combustion with an intense heat.

Each melter and furnace is supplied with one melting pot, one hand ladle, pipe connections, and necessary stop cocks.

Number		1	2
Price	each	45.00	35.00

C. & L. TORCHES

FOR GASOLINE

No. 32, GASOLINE

Fig. 5425A

No. 31, GASOLINE

Fig. 5425B

No. 32 is desirable where intense heat is wanted, and has integral hook and support for holding soldering copper. Burner is made of special generator metal which retains the heat, producing an intensely hot blue flame that burns in hard wind or extreme cold. Patented automatic brass pump in tank, with automatic double spring check, supplies required air pressure.

No. 31 is like No. 32 except without hook and support. A good plain quart torch.

No. 32

Capacity.....pints 2
Price.....each 16.00

No. 31

Capacity.....pints 2
Price.....each 15.20

No. 38, GASOLINE

Fig. 5425C

No. 37, GASOLINE

Fig. 5425D

No. 38 has improved burner of special generator metal, which produces a blue flame of intense heat, indoors or out. Hook and support for holding soldering copper is a convenience.

No. 37 is like No. 38, but without hook and support.

No. 38

Capacity.....pints 1
Price.....each 14.40

No. 37

Capacity.....pints 1
Price.....each 13.60

No. 108, GASOLINE

Fig. 5425E

No. 112, GASOLINE

Fig. 5425F

No. 108 has pump in handle with double spring automatic check valve, insuring ample air pressure. Special generator metal burner holds heat and produces a blue flame of intense heat. Hook and support for holding soldering copper is a great convenience for repair men.

The No. 112 is a good torch for the price. While not as good as others that have the patented automatic brass pump, it produces a steady flame of intense heat. Tank is made of heavy brass.

No. 108

Capacity.....pints 2
Price.....each 15.20

No. 112

Capacity.....pints 2
Price.....each 14.40

No. 90 KEROSENE

Fig. 5425G

No. 28, ALCOHOL

Fig. 5425H

No. 90 torch will be appreciated by users of kerosene tools. The burner produces an intensely hot, clear blue flame, about 6 inches in length, generating sufficient heat to quickly melt a ¼-inch copper rod.

No. 28 is a torch for electricians' and jewelers' use or for any work requiring a pointed concentrated flame.

No. 90

Capacity.....pints 2
Price.....each 17.60

No. 28

Capacity.....pints ¼
Price.....each 5.20

C. & L. FIRE POTS

No. 1 GASOLINE

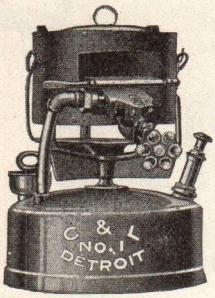


Fig. 5437A

No. 21 GASOLINE

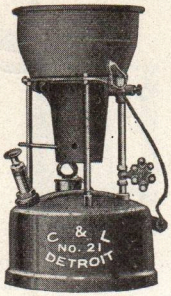


Fig. 5437B

No. 1. The tank is of heavy gauge seamless drawn steel with bottom and fittings welded in, tinned inside and out, and has extra large special generator.

Swiveled burner permits moving flame up or down. No. 1 will heat a pair of 12-pound coppers and melt a pot of lead or solder at the same time.

No. 21. The tank is made of heavy steel with bottom and fittings welded in. Heavy uprights support extra heavy top plate. The filler is large and funnel shaped, with large filler plug. Shield is of drawn steel. Air pressure is secured by automatic pump.

No. 1

Capacity.....pints 7
Price.....each 27.20

No. 21

Capacity.....pints 8
Price.....each 21.20

No. 5 GASOLINE

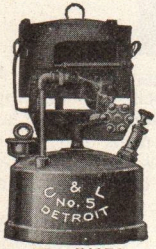


Fig. 5437C

No. 5 fire pot is one size smaller than the No. 1. Accommodates 8-pound coppers.

No. 5

Capacity.....pints 5
Price.....each 24.80

No. 11, GASOLINE

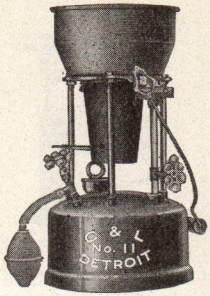


Fig. 5437D

No. 20, GASOLINE

Fig. 5437E

No. 11 coil fire pot is the same as No. 21, but fitted with a rubber bulb.

No. 20 coil fire pot is made with heavy galvanized iron tank, with sloping sides fitted with heavy ring protecting the bottom of tank. An automatic brass pump with double spring check valve produces ample air pressure.

No. 11

Capacity.....pints 8
Price.....each 19.60

No. 20

Capacity.....pints 8
Price.....each 16.60

No. 221, KEROSENE

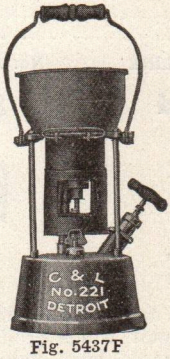


Fig. 5437F

No. 221. The burner is made with a powerful generator that superheats the kerosene gas before it is burned, securing combustion of the fuel. All parts are easily accessible for cleansing. The tank is made of heavy gauge steel, with bottom and fittings welded in.

No. 221

Capacity.....pints 8
Price.....each 33.60

WELDING COMPOUND

CLIMAX WELDING COMPOUND

Fig. 8781A

BORAX-ETTE

Fig. 8781B

CLIMAX WELDING COMPOUND AND BORAX-ETTE

Size of Package.....	1-lb. Box	5-lb. Box	10-lb. Box	25-lb. Box	50-lb. Box	100-lb.Box	150-lb.Box	*350-lb.Bbl.	*550-lb.Bbl.
Price.....per pound	.18	.12	.12	.11	.11	.10¾	.10⅝	.10½	.10

*Climax Welding only.

CHERRY HEAT WELDING COMPOUND
The Best Flux known for Welding

And MALLEABLE Iron to Steel.

Fig. 8781C

E-Z WELDING COMPOUND

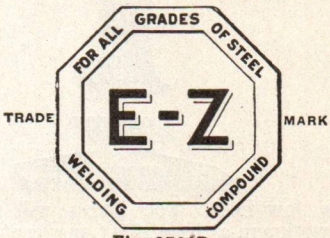


Fig. 8781D

CHERRY HEAT WELDING COMPOUND

Size of Package....	1-lb. Box	5-lb. Box	10-lb. Box	25-lb. Box	50-lb. Box	100-lb. Box	350-lb. Bbl.	550-lb. Bbl.
Price ....per pound	.18	.12	.12	.11	.11	.10¾	.10½	.10

E-Z WELDING COMPOUND

E-Z Welding Compound sticks to the metal at a low heat and is equally good for lap, split, V butt or jump welding. It will weld tool, plow, open-hearth and Bessemer steel, making a stronger and smoother weld, at 250 degrees lower heat than any other compound. We will guarantee it to give the best satisfaction and will be glad to send you a box on approval.

Size of package.....	1-lb. Box	5-lb. Box	10-lb. Box	25-lb. Box	50-lb. Box	100-lb. Drum	300-lb. Bbl.	600-lb. Bbl.
Price..... per pound	.18	.13	.13	.12	.12	.11¾	.11½	.11

When ordering, be sure to state size of boxes, and brand of compound wanted.

LAFFITTE WELDING AND BRAZING PLATES

1918 REVISION

WELDING PLATES

4X8 INCHES

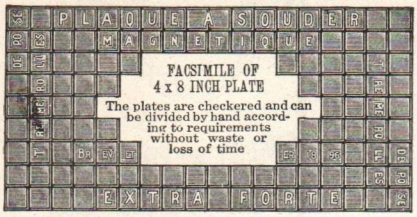
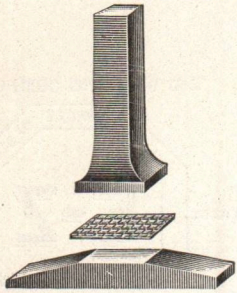


Fig. 10500A

These plates lower the costs, improve the work and enable the workman to enlarge his scope. The chemical action of the plate increases the strength of the weld. With them work can be welded at

METHOD OF APPLICATION



a low heat. The plates will save the workman at least 33⅓ per cent in time and fuel.

Price, Heavy	per 100		**35.00**
" Light	"		**31.00**

WELDING POWDER

Used in exceptional cases where the rigidity of the plate does not lend itself to the work to be done, such as welding in a hole, cementing a flaw, etc.

Price, 1-lb. Boxes	per pound		**.70**
" 5 " Bags	"		**.68**
" 55 " Sacks	"		**.65**

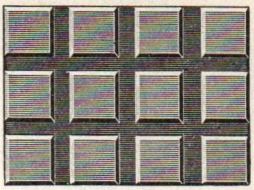
BRAZING POWDER

Used as ordinary borax, but one pound will do the work of 4 pounds of borax. The copper solder, which is always necessary to add, is not displaced.

Price, 1- lb. Boxes	per pound		**1.25**
" 2½ " "	"		**1.20**

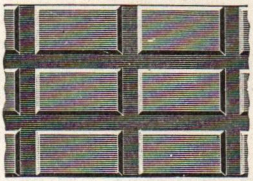
BRAZING PLATES

No. 1, FOR BRAZING BRASS, RED COPPER AND BRONZE



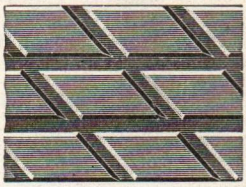
Designed to do away with the use of borax, and contains all the necessary ingredients for a perfect braze, including the right proportion of spelter.

No. 2, FOR BRAZING RED COPPER AND IRON



Nos. 1, 2 and 3 melt at different temperatures, enabling the brazier to have a spelter which fuses at a lower heat than the metal which is to be brazed.

No. 3, FOR BRAZING IRON AND STEEL



Does quick clean, efficient work.

Does away with sw lling and blistering, which causes a great waste of copper solder.

These plates are easy to apply. The required size of plate is placed on the surface of the metal then heated to the desired temperature.

Price, Nos 1 or 2, 1-lb.	per box		**2.20**
" " 1 " 2, 2 "	"		**4.25**
" " 3, 1-lb.	"		**2.20**
" " 3, 2 "	"		**4.25**

PILLEY'S FLUE BRUSHES, SCRAPERS AND STEAM TUBE CLEANERS

COMBINATION BRUSH AND SCRAPER

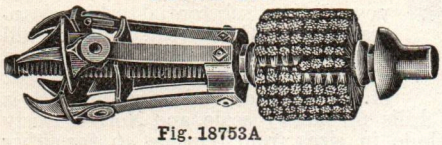


Fig. 18753A

Fits all size tubes from 2 to 6 inches.
Price.....per diam. inch **1.00**

ELLIPTICAL SCRAPER WITH BRUSH

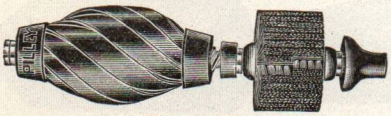


Fig. 18753B

Fits tubes from 2 to 6 inches.
Price.....per diam. inch **1.00**

EXPANSION WIRE TUBE BRUSH

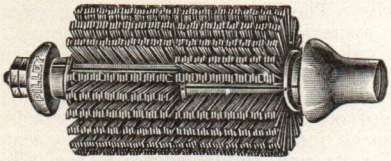


Fig. 18753C

Fits tubes from 1½ to 6 inches.
Price.....per diam. inch **1.00**

ELLIPTICAL SCRAPERS

Fig. 18753D

Fits tubes from 1½ to 6 inches.
Price.....per diam. inch **1.00**

ENGINEER'S FAVORITE FLUE SCRAPERS

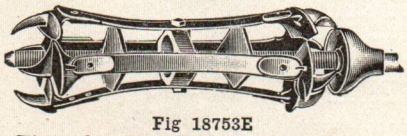


Fig 18753E

Fits tubes from 1¾ to 6 inches.
Price.....per diam. inch **1.00**

ABRAMS FLUE BRUSHES

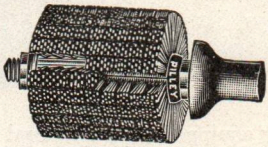


Fig. 18753F

Fits tubes from 2 to 6 inches.
Price.....per diam. inch **1.00**

SPIRAL FLUE BRUSHES, FLAT WIRE

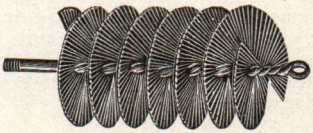


Fig. 18753G

Fits tubes from 1 to 6 inches.
Price.....per diam. inch **1.00**

COIL BRUSH AND SCRAPER COMBINED

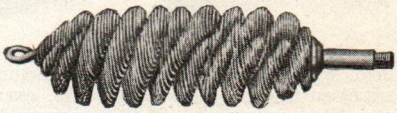


Fig. 18753H

Fits tubes from 1 to 4 inches.
Price.....per diam. inch **1.00**

STEAM TUBE CLEANERS
FOR HORIZONTAL BOILERS

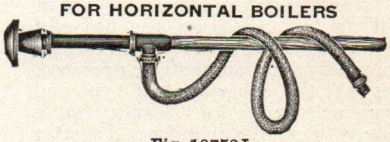


Fig. 18753J

Valves can be attached to either horizontal or vertical boiler steam cleaners.

No. 1 fits tubes from 1½ to 3 inches in diameter.

No. 2 for tubes 3 to 6 inches in diameter.

Price,	No. 1, without Valve	each	8.00
"	" 1, with Valve	"	12.00
"	" 2, without Valve	"	10.00
"	" 2, with Valve	"	14.00

All Flue Brushes and Scrapers under 2-inch Diameter.....each **2.00**

LIBERTY BOILER TUBE CLEANERS

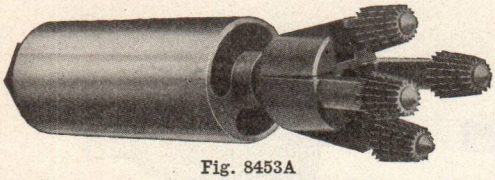


Fig. 8453A

BULL DOG CLEANERS

The Bull Dog Turbine Cleaner, water operated, is one of the most powerful and substantial turbine cleaners made for this class of work. It will clean a great number of tubes in a short time at a remarkably small cost of maintenance and operation. It is regularly equipped with universal joint and drills for heavy scale, and Norivet freely swinging arm cutting head for light scale. Made in sizes from 3 inches up, for either straight or curved tubes.

C. D. STANDARD CLEANERS

Designed for plants having a small number of boilers and where the scale conditions are not extremely hard and heavy. It is water operated and is similar to the Bulldog, with the exception of the body, which is made of bronze instead of steel.

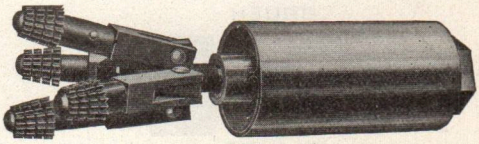


Fig. 8453B

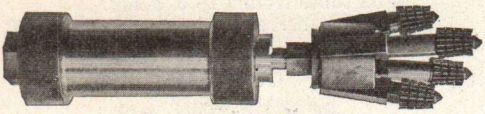


Fig. 8453C

VICTOR CLEANERS

The Victor Cleaner, air or steam operated is one of the most powerful tube cleaners manufactured. It is designed and built to withstand severe service and constant operation. Its action is always positive and it will not get out of order. The regular equipment furnished with the Victor Cleaner includes universal joint and drills for heavy scale. Norivet cutting head for light scale, extra spare parts and sight feed lubricator. The Victor Cleaner is made in all sizes from 1½ inches up, for either straight or bent tubes.

CYCLONE CLEANERS

Where scale conditions are not so hard as to necessitate the use of a cleaner as powerful as the Victor, we offer the Cyclone, air or steam operated. This is of the same general type and design as the Victor Cleaner, but is made with smaller cylinder and shorter bearings.

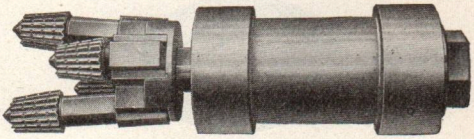


Fig. 8453D

Type	Size Inches	Price Complete
Bulldog	3½ and 4	.....
"	3 " 3¼	.....
Liberty Standard (CD)	3½ " 4	.....
" " (ED)	3 " 3¼	.....
" " (BA)	1¾ to 3	.....
Cyclone (OA)	3½ and 4	.....
" (OA)	2 to 3¼	.....
Victor (OF)	1½ " 4	.....
Spec. O. A. Cyc. for F. T. Boilers	2, 2¼, 3½, 4	.....

TUBE EXPANDERS

ROLLER TUBE EXPANDERS

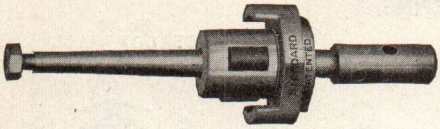


Fig. 7685A

The diameter inches given in the list refers to the outside diameter of a tube. For instance for a 2-inch tube which is 2-inch outside diameter, order an expander — diameter, inches, 2.

Diameter.....inches	1	1¼	1½	1¾	1⅞	2	2¼	2½	2¾
Price.....each	10.00	10.00	10.00	10.00	10.00	10.00	12.00	14.00	16.00
Diameter.....inches	3	3¼	3½	3¾	4	4¼	4½	5	6
Price.....each	18.00	20.00	23.00	25.00	30.00	40.00	50.00	60.00	70.00

DUDGEON'S EXPANDERS

ROLLER TUBE

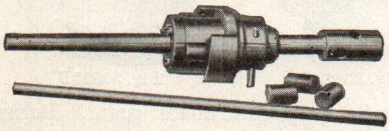


Fig. 7685B

COMPOUND ROLLER TUBE

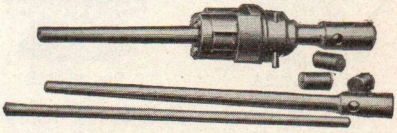


Fig. 7685C

ROLLER TUBE

Size.....inches	1	1¼	1½	1¾	1⅞	2	2¼	2½	2¾
Price.....each	10.00	12.00	13.00	15.00	17.00	20.00	25.00	29.00	34.00
Size.....inches	3	3¼	3½	4	4½	5	6	7	....
Price.....each	39.00	44.00	48.00	58.00	60.00	75.00	90.00	110.00	....

The size refers to the external diameter of tube.

COMPOUND ROLLER TUBE

Will expand two sizes up to 2 inches, and three sizes above, as shown in list.

Size.....inches	1⅝ & 1¾	1¾ & 1⅞	1⅞ & 2	2, 2⅛ & 2¼	2¼, 2⅜ & 2½	2½, 2⅝ & 2¾
Price.....each	20.00	22.00	25.00	30.00	35.00	40.00
Size.....inches	2¾, 2⅞ & 3	3, 3⅛ & 3¼	3¼, 3⅜ & 3½	3½, 3⅝ & 3¾	3¾, 3⅞ & 4	4, 4⅛ & 4¼
Price.....each	45.00	52.00	60.00	65.00	70.00	75.00
Size.....inches	4¼, 4⅜ & 4½	4½, 4⅝ & 4¾	4¾, 4⅞ & 5	5, 5¼ & 5½	5½, 5¾ & 6	6, 6¼ & 6½
Price.....each	80.00	85.00	90.00	100.00	110.00	120.00

The size refers to the external diameter of tube.

SPECIAL ROLLER TUBE EXPANDERS

OUTFIT COMPLETE

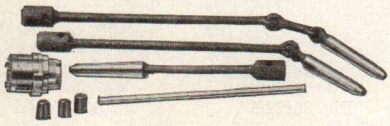


Fig. 7685D

This expander is intended for expanding the tubes in water tube boilers with 4-inch tubes.

Price.....each	50.00

WITH GUIDE RING REMOVED

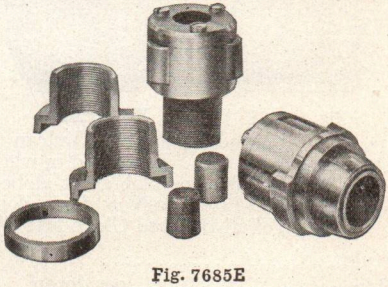


Fig. 7685E

LANTERNS AND LANTERN GLOBES

LANTERNS

No. 39 STANDARD RAILROAD

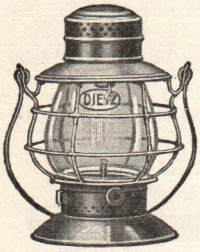


Fig. 30422A

LITTLE WIZARD

Fig. 30422B

No. 2 WIZARD

Fig. 30422C

No. 30 BEACON WALL

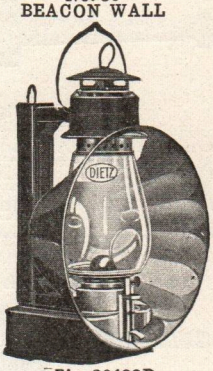


Fig. 30422D

No. 39 Standard Cold Blast, with wing-lock ratchet burner and double guard. Burns signal oil.

Little Wizard Cold Blast with wick exposed for trimming and lighting. Has short globe.

No. 2 Wizard Cold Blast and mechanically perfect, fitted with Loc-Nob short globe, easiest to handle.

No. 30 Beacon Wall with large fluted reflectors.

Style	No. 39 Standard	Little Wizard	No. 2 Wizard	No. 30 Beacon Wall
Light ... candle power	2	6	10	50
Wick ... inches	1	5/8	1	1
Capacity ... hours	24	18	20	35
Price ... per dozen	**21.80**	**15.10**	**18.80**	**36.00**
" Burners ... "	.....	.....	.....	.....

LANTERN GLOBES

No. 39 STANDARD RAILROAD

Fig. 30422E

LITTLE WIZARD

Fig. 30422F

No. 2 WIZARD

Fig. 30422G

No. 30 BEACON WALL

Fig. 30422H

No. 39 Standard Railroad Vulcan Globes are removed through the frame by turning back the hinged top. Furnished in white, ruby, blue or green.

Little Wizard Loc-Nob short globe in which hand may be inserted for cleaning.

Wizard D-Lite Loc-Nob short globes are readily accessible and easy to clean.

Beacon Wall Blizzard Globe lifts clear of the burner to permit trimming and lighting.

Style	No. 39 Standard	Little Wizard	No. 2 Wizard	No. 30 Beacon Wall
Price ... per dozen	**3.50**	**2.60**	**3.15**	**3.30**

STANDARD LIST STEEL SHAFTING

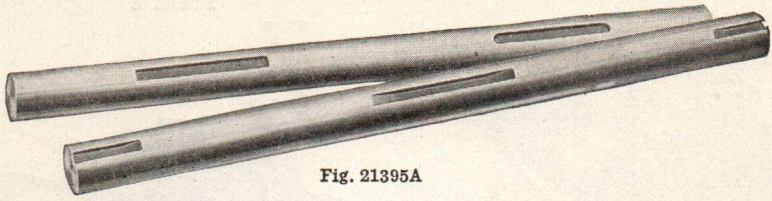


Fig. 21395A

EXTRAS FOR SIZES, PER 100 POUNDS NET

EFFECTIVE AUGUST 18, 1919

ROUNDS

1/8 to 5/32 In.	2.25	
3/16 " 7/32 "	1.50	
1/4 " 3/8 "	.90	
7/16 " 9/16 "	.60	
5/8 " 3/4 "	.40	
13/16 " 1 1/16 "	.30	
1 1/8 to 1 7/16 in.	.25	
1 1/2 " 2 3/16 "	.15	
2 1/4 " 3 "	Base	
3 1/16 " 3 7/16 "	.25	
3 1/2 " 3 15/16 "	.50	
4 " 4 7/16 "	.80	
4 1/2 to 4 15/16 In.	.90	
5 " 5 7/16 "	1.00	
5 1/2 " 5 15/16 "	1.50	
6 " 6 7/16 "	2.00	
6 1/2 " 7 "	2.50	

EXTRA FOR ODD AND INTERMEDIATE SIZES

The following sizes in rounds, hexagons and squares shall be considered standard:
By 64ths to 1 inch, inclusive.
By 32nds, 1 1/32 to 1 31/32 inches, inclusive.
By 16ths, 2 inches to maker's limit.

All odd and intermediate sizes, excepting those allowing a total tolerance of .008 inch (and such specifications shall be for not less than 2000 pounds of a size), not less than 25 cents per 100 pounds net extra, in addition to the usual extras for accuracy, etc.

QUANTITY DIFFERENTIALS

All specifications for less than 2000 pounds of a size will be subject to the following extras, the total weight of a size ordered to determine the extra, regardless of length and regardless of the exact quantity actually shipped:

1000 to 1999 Pounds.....per 100 pounds net .15
Less than 1000 Pounds..... " " " .35

EXTRAS FOR LONG AND SHORT LENGTHS

PRICE, PER 100 POUNDS NET

Size Inches	Rounds	Squares	Hexagons	Flats
3 to 5 15/16	1.50	1.50	1.50	3.00
6 " 11 15/16	.75	.75	.75	1.50
12 " 23 15/16	.30	.60	.30	.75
24 " 59 15/16	.15	.30	.15	.40

Lengths Longer than 24 Feet and Less than 30 Feet.....per 100 pounds net .50
" " " 30 " " " " 35 " ..... " " " 1.00
" " " 35 " " " " 40 " ..... " " " 1.50
" " " 40 " " " " 45 " ..... " " " 2.00
" 45 Feet and Longer..... " " " 2.50

Extras for long lengths apply on rounds, squares, hexagons and flats.

EXTRAS FOR CHAMFERING

FOR AUTOMATIC SCREW MACHINE USE ONLY

PRICE, PER 100 POUNDS NET

Size Inches	Rounds	Hexagons and Squares	Size Inches	Rounds	Hexagons and Squares
7/16 to 5/8	13	.15	1 to 2	.065	.115
11/16 " 15/16	.10	.13	2 1/16 and Longer	.04	.10

These extras apply on lengths 10 feet and longer and one end bar only. For sizes smaller than 7/16 inch and bars shorter than 10 feet, sp ecial prices will be quoted.

KEY-SEATERS AND KEY-SEAT MILLERS

STYLE A

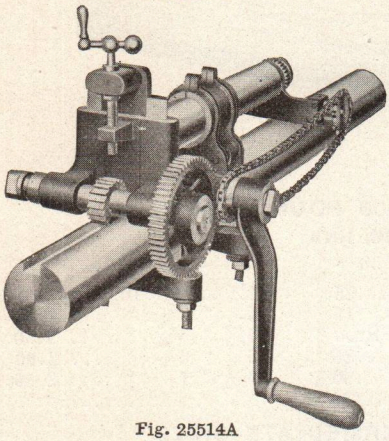


Fig. 25514A

STYLE B

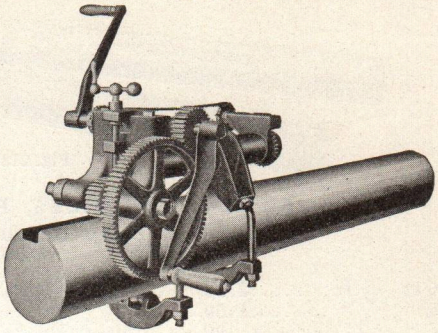


Fig. 25514B

STYLE A PORTABLE KEY-SEATERS

Designed to meet the modern demands of master mechanics, millwrights and repairmen, in mills, mines and factories. The sliding head is cast solid to spindle. The feed screw being inside of spindle, brings the pulling strain very close to shaft. The feeding mechanism is disengaged by sliding clutch on rear end. This machine is furnished with five milling cutters which can be ganged up to cut from ¼ to 1¼ inches wide, in all standard widths. It will cut keyways in shafts from 1¼ to 5 inches in diameter and 12 inches long without resetting. An 18-inch pulley can be furnished with this machine, properly fitted for motor or shaft drive.

STYLE A-I PORTABLE KEY-SEATERS

The general construction of this machine is the same as style A, except that it has two handles and can be operated by two men if necessary.

STYLE B PORTABLE KEY-SEATERS

Designed to meet the demands of heavy duty keyseating. The construction of this machine is the same as the Style A, except that it has two handles and can be operated by two men if necessary. It is furnished regularly with six milling cutters and will cut keyways from ¼ to 2 inches wide in shafting from 2 up to 8 inches in diameter and 12 inches long without resetting. Any size pulley desired can be furnished for this machine; also small set of milling cutters which will enable this machine to cut down to 1¼-inch shafting.

Prices upon application.

NATIONAL KEY-SEATING MILLERS

Designed for use in the drill press for milling internal keyseats. They are regularly made with straight shank to grip in the drill chuck and can be chucked as readily as any straight shank drill. Taper shanks can be fitted if desired. The millers are made in twenty different diameters in the sizes most commonly used from ⅝ inch to 3½ inches.

Eccentric bushings are made for each miller and are used in connection with the miller whereby one tool may be used to keyseat several different sizes of holes above its own diameter. Each miller will operate two different widths of cutters. The tools are fitted with a rotary cutter that mills the internal keyseat in one cut. To complete a keyseat it is only necessary to pass the tool through the work just once.

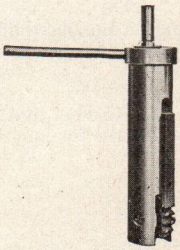


Fig. 25514C

Prices upon application. Prices quoted on special width cutters and special diameter cutters for milling extra wide and deep keyseats; also on special key-seating millers for odd diameter holes and for extra long length holes.

KEYSEATING SHAFTING AND TURNING DOWN ENDS

KEY-SEATED FOR COUPLINGS, ENDS LEFT AS MADE BY MILLING CUTTER

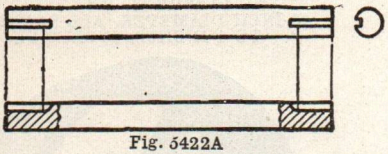


Fig. 5422A

ROUND END KEY SEATS, DRILLED WITH BOTTOM LEVEL

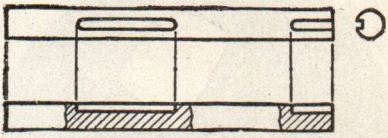


Fig. 5422B

MIDDLE KEY SEATS FOR PULLEYS, ENDS LEFT AS MADE BY MILLING CUTTER

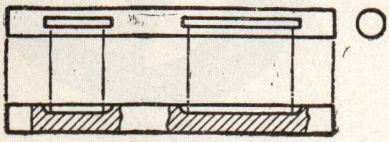


Fig. 5422C

SQUARE END KEY SEATS, WITH BOTTOM LEVEL

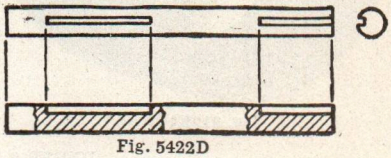


Fig. 5422D

Diameter of Shaft Inches	Key Seat Width Inches	Depth Inches	Keyseating 1 Foot or less for Couplings per End	Keyseating Full Length Standard Sizes per Foot	Middle Splines 1st Foot or Less	Middle Splines 2nd Foot or More per Foot	Extra for Rounding or Squaring End of Key Seat per Key Seat	Turning Down 1st Foot ¼-inch Reduction or Less	Turning Down 2nd Foot ¼-inch Reduction for Less	Turning Down Each Additional ¼-inch Reduction per Foot
¾ to 1¼	¼	⅛	.35	.20	.75	.20	1.00	1.35	.35	.20
1 5/16 " 1¾	⅜	3/16	.40	.25	.80	.25	1.00	1.45	.40	.30
1 13/16 " 2¼	½	¼	.45	.30	1.00	.30	1.20	1.90	.55	.40
2 5/16 " 2¾	⅝	5/16	.70	.35	1.30	.35	1.40	2.15	.75	.50
2 13/16 " 3¼	¾	⅜	.95	.45	1.55	.45	1.60	2.40	.85	.60
3 5/16 " 3¾	⅞	7/16	1.25	.60	1.80	.60	1.80	2.65	.95	.70
3 13/16 " 4¼	1	½	1.50	.80	2.05	.80	2.00	3.00	1.10	.80
4 5/16 " 4¾	1⅛	9/16	1.65	.90	2.25	.90	2.20	3.60	1.20	.90
4 13/16 " 5¼	1¼	⅝	2.00	1.20	2.50	1.20	2.40	4.30	1.30	1.00
5 5/16 " 5¾	1⅜	11/16	2.20	1.35	2.75	1.35	2.60	4.70	1.45	1.10
5 13/16 " 6¼	1½	¾	2.40	1.50	3.00	1.50	2.80	5.40	1.55	1.20
6 5/16 " 7¼	1¾	¾	2.70	1.80	3.35	1.80	3.00	6.00	1.65	1.30
7 5/16 " 8¼	2	¾	3.20	2.55	3.85	2.55	3.60	7.10	1.95	1.40
8 5/16 " 9¼	2¼	⅞	3.70	3.35	4.35	3.35	4.20	7.90	2.20	1.50
9 5/16 " 10¼	2½	⅞	4.30	4.15	4.85	4.15	4.80	8.40	2.45	1.70
10 5/16 " 11¼	2¾	⅞	4.90	4.80	5.45	4.80	6.00	9.10	2.75	1.90
11 5/16 " 12¼	3	⅞	5.55	5.35	6.10	5.35	7.20	9.85	3.15	2.10

Key seats for friction clutches are made square ends.

DODGE
"INDEPENDENCE" WOOD SPLIT PULLEYS

LARGER SIZES

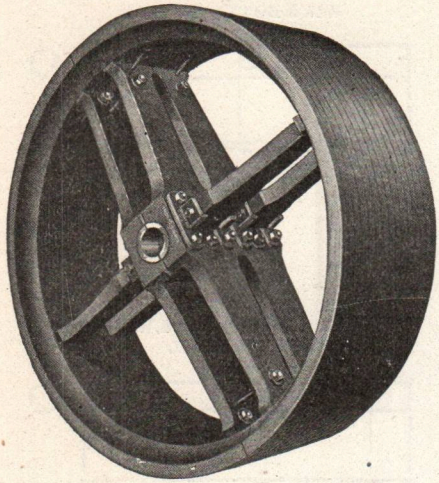


Fig. 9122A

9 TO 30-INCH DIAMETER, INCLUSIVE, ALL FACES
32 TO 36-INCH DIAMETER, INCLUSIVE, ALL FACES UP TO 16 INCHES, INCLUSIVE
38-INCH DIAMETER, ALL FACES UP TO 10 INCHES, INCLUSIVE
40-INCH DIAMETER, ALL FACES UP TO 4 INCHES, INCLUSIVE

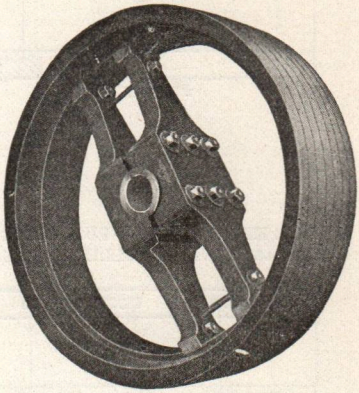
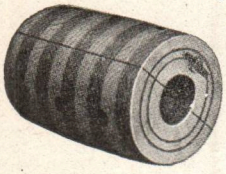
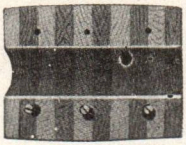


Fig. 9122B

UNDER 9-INCH DIAMETER





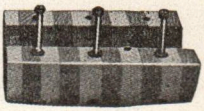


Fig. 9122C

For pulleys with offset hub add 10 per cent to final list.

For step cone pulleys treat each step as a separate pulley, combine the lists and add 50 per cent.

Flange pulleys: Add to regular list price for single flange, 20 per cent; double flange, 25 per cent; triple flange, 30 per cent.

Odd diameters: When in fractions of an inch, or in odd inches not listed, use next larger diameter.

Odd faces: When in fractions of an inch, or in odd inches not listed, use next wider face.

STANDARD BORES

Diam. of Pulley	inches	3	4	5 to 7	8 to 23	24 to 48	50 to 72
Bore	"	1½	2	2 7/16	3	3½	4½
Diam. of Pulley	inches	72—up to 12-in. Face		72—13-in. Face and Wider		73 to 96	97 to 120
Bore	"	4½			up to 6	up to 6	up to 7½

Pulleys 72 inches in diameter by 12-inch face and under, are bored standard; those with greater face width are bored to shaft size.

Extra charge for boring pulleys larger than above, and key-seating.

DODGE WOOD SPLIT PULLEYS

Diameter Inches	Width of Face, Inches												
	3	4	5	6	8	10	12	14	16	18	20	22	24
3	2.80	2.90	3.10	3.30	3.70	4.10	4.50	....	....	....	....	....	....
4	2.80	2.90	3.10	3.30	3.70	4.10	4.50	....	....	....	....	....	....
5	2.85	2.95	3.20	3.40	3.85	4.30	4.75	....	....	....	....	....	....
6	2.90	3.00	3.25	3.50	4.00	4.50	5.00	....	....	....	....	....	....
7	2.95	3.05	3.35	3.60	4.15	4.70	5.25	5.80	....	....	....	....	....
8	3.00	3.10	3.40	3.70	4.30	4.90	5.50	6.10	....	....	....	....	....
9	3.10	3.25	3.60	3.90	4.55	5.20	5.85	6.50	....	....	....	....	....
10	3.25	3.40	3.75	4.10	4.80	5.50	6.20	6.90	7.60	....	....	....	....
11	3.50	3.70	4.10	4.50	5.30	6.10	6.90	7.70	8.50	....	....	....	....
12	3.75	4.00	4.45	4.90	5.80	6.70	7.60	8.50	9.40	10.30	....	....	....
13	....	4.30	4.80	5.30	6.30	7.30	8.30	9.30	10.30	11.30	....	....	....
14	....	4.60	5.15	5.70	6.80	7.90	9.00	10.10	11.20	12.30	13.40	....	....
15	....	4.90	5.50	6.10	7.30	8.50	9.70	10.90	12.10	13.30	14.50	....	....
16	....	5.20	5.85	6.50	7.80	9.10	10.40	11.70	13.00	14.30	15.60	16.90	....
17	....	5.50	6.20	6.90	8.30	9.70	11.10	12.50	13.90	15.30	16.70	18.10	....
18	....	5.80	6.55	7.30	8.80	10.30	11.80	13.30	14.80	16.30	17.80	19.30	20.80
19	....	6.10	6.90	7.70	9.30	10.90	12.50	14.10	15.70	17.30	18.90	20.50	22.10
20	....	6.40	7.25	8.10	9.80	11.50	13.20	14.90	16.60	18.30	20.00	21.70	23.40
22	....	7.00	7.95	8.90	10.80	12.70	14.60	16.50	18.40	20.30	22.20	24.10	26.00
24	....	7.70	8.80	9.90	12.10	14.30	16.50	18.70	20.90	23.10	25.30	27.50	29.70
26	....	8.40	9.65	10.90	13.40	15.90	18.40	20.90	23.40	25.90	28.40	30.90	33.40
28	....	9.10	10.50	11.90	14.70	17.50	20.30	23.10	25.90	28.70	31.50	34.30	37.10
30	....	9.80	11.35	12.90	16.00	19.10	22.20	25.30	28.40	31.50	34.60	37.70	40.80
32	....	10.50	12.20	13.90	17.30	20.70	24.10	27.50	30.90	34.30	37.70	41.10	44.50
34	....	11.30	13.15	15.00	18.70	22.40	26.10	29.80	33.50	37.20	40.90	44.60	48.30
36	....	12.10	14.10	16.10	20.10	24.10	28.10	32.10	36.10	40.10	44.10	48.10	52.10
38	....	....	....	17.20	21.50	25.80	30.10	34.40	38.70	43.00	47.30	51.60	55.90
40	....	....	....	18.30	22.90	27.50	32.10	36.70	41.30	45.90	50.50	55.10	59.70
42	....	....	....	19.60	24.60	29.60	34.60	39.60	44.60	49.60	54.60	59.60	64.60
44	....	....	....	20.90	26.30	31.70	37.10	42.50	47.90	53.30	58.70	64.10	69.50
46	....	....	....	22.30	28.10	33.90	39.70	45.50	51.30	57.10	62.90	68.70	74.50
48	....	....	....	23.80	30.00	36.20	42.40	48.60	54.80	61.00	67.20	73.40	79.60
50	....	....	....	25.40	32.00	38.60	45.20	51.80	58.40	65.00	71.60	78.20	84.80
52	....	....	....	27.10	34.10	41.10	48.10	55.10	62.10	69.10	76.10	83.10	90.10
54	....	....	....	28.90	36.30	43.70	51.10	58.50	65.90	73.30	80.70	88.10	95.50
56	....	....	....	30.80	38.60	46.40	54.20	62.00	69.80	77.60	85.40	93.20	101.00
58	....	....	....	32.80	41.00	49.20	57.40	65.60	73.80	82.00	90.20	98.40	106.60
60	....	....	....	34.90	43.50	52.10	60.70	69.30	77.90	86.50	95.10	103.70	112.30
62	....	....	....	37.10	46.10	55.10	64.10	73.10	82.10	91.10	100.10	109.10	118.10
64	....	....	....	39.40	48.80	58.20	67.60	77.00	86.40	95.80	105.20	114.60	124.00
66	....	....	....	41.90	51.80	61.70	71.60	81.50	91.40	101.30	111.20	121.10	131.00
68	....	....	....	44.50	54.90	65.30	75.70	86.10	96.50	106.90	117.30	127.70	138.10
70	....	....	....	47.20	58.10	69.00	79.90	90.80	101.70	112.60	123.50	134.40	145.30
72	....	....	....	50.00	61.40	72.80	84.20	95.60	107.00	118.40	129.80	141.20	152.60
78	....	....	....	....	71.90	84.80	97.70	110.60	123.50	136.40	149.30	162.20	175.10
84	....	....	....	....	83.30	97.70	112.10	126.50	140.90	155.30	169.70	184.10	198.50
90	....	....	....	....	95.60	111.50	127.40	143.30	159.20	175.10	191.00	206.90	222.80
96	....	....	....	....	109.00	126.50	144.00	161.50	179.00	196.50	214.00	231.50	249.00
102	....	....	....	....	123.70	143.00	162.30	181.60	200.90	220.20	239.50	258.80	278.10
108	....	....	....	....	139.30	160.40	181.50	202.60	223.70	244.80	265.90	287.00	308.10
114	....	....	....	....	155.80	178.70	201.60	224.50	247.40	270.30	293.20	316.10	339.00
120	....	....	....	....	173.20	197.90	222.60	247.30	272.00	296.70	321.40	346.10	370.80

DODGE "INDEPENDENCE" WOOD SPLIT PULLEY EXTRAS

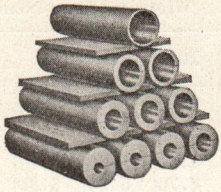


Fig. 9124A

WOOD SPLIT BUSHINGS

Diameter of Pulley .inches	3	4	4½ to 7	7½ to 23	23½ to 48	48½ to 72
Standard Bore of Pulley "	1½	2	2 7/16	3	3½	4½
For Maximum Shaft Diam. "	1⅜	1⅞	2 5/16	2⅞	3⅜	4⅜

Bushings will be furnished bored to suit any shaft size up to the maximum.

EXTRA BUSHINGS FOR WOOD PULLEYS—PRICE, EACH

Length Inches	Outside Diameter of Bushing, Inches				
	1½ and 2	2 7/16	3	3½	4½
6	.20	.30	.40	.50	.70
8	.30	.40	.55	.65	.95
10	.40	.50	.70	.85	1.20
12	.50	.60	.80	1.00	1.40
14	.60	.70	.95	1.15	1.65
16	.70	.80	1.10	1.30	1.90
18	.80	.90	1.20	1.50	2.10
20	.90	1.00	1.40	1.70	2.40

These prices are for any bore ordered, within the limits shown above.

For single bushings a minimum net charge is made of 15 cents each for 1½, 2 and 2 7/16-inch, 25 cents each for 3 and 3½-inch, and 50 cents for 4 and 4½-inch outside diameter. Larger special bushings, prices upon application.

KEYSEATING—PRICE, EACH

When desired, wood pulleys can be key-seated in the same way as iron pulleys are key-seated. No bushing is used in this case, the hub being bored to shaft size, and the keyway is cut in the solid wood of the hub.

Size of Shaft Inches	Width of Face of Pulley, Inches			
	12 or Less	14 to 16	18 to 20	22 to 24
3 or less	1.25	1.75	2.35	3.00
3 1/16 to 3½	1.30	1.80	2.45	3.10
3 9/16 " 4	1.50	2.00	2.70	3.35
4 1/16 " 4½	2.00	2.50	3.00	3.50
4 9/16 " 5	2.35	3.00	3.70	4.35
5 1/16 " 6	3.00	3.75	4.50	5.35
6 1/16 " 7	3.75	4.50	5.25	6.10

All extra list prices on above schedule are subject to same discount as that applying on pulleys of standard construction.

NATIONAL ALL STEEL SPLIT PULLEYS

CROWN OR FLAT

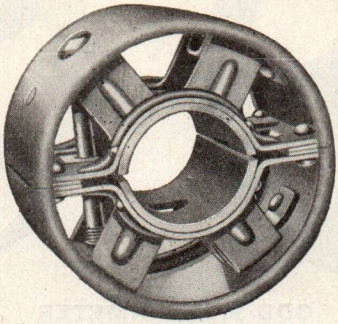


Fig. 8951A

These pulleys are made in 3, 4 and 5-inch diameters and 3 to 6-inch faces, inclusive.

In offering this pulley it has been the endeavor of the manufacturer to produce an article, regardless of cost, which is perfect and complete.

We invite careful examination.

It is simple and durable.

With the special patented construction of the hub and arms, together with the arrangement of the bolts, the maker has been able to produce a pulley which is mechanical in every detail, easily adjusted to the shaft, combining strength and durability.

Diam. Inches	Price, Each — Width of Face, Inches			
	3	4	5	6
3	2.40	2.52	2.64	3.30
4	2.52	2.64	2.75	3.45
5	2.68	2.75	2.87	3.75

BORES

3-inch pulleys are made with 1 7/16-inch bore.

4 and 5-inch pulleys are made with 1 15/16-inch bore.

Bushings to fit shafts of smaller diameter.

All hubs are 3 inches long.

A wrench is furnished with every pulley.

We consider these pulleys the only practical steel split pulley made in small sizes, and recommend them for any purpose for which a 5-inch or smaller diameter pulley is required.

ONEIDA PRESSED STEEL SPLIT PULLEYS

SHOWING CONSTRUCTION 12 TO 20 INCHES IN DIAMETER

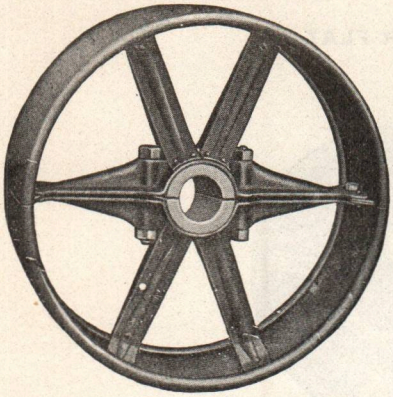


Fig. 2975A

SHOWING CONSTRUCTION LARGER THAN 20 INCHES IN DIAMETER

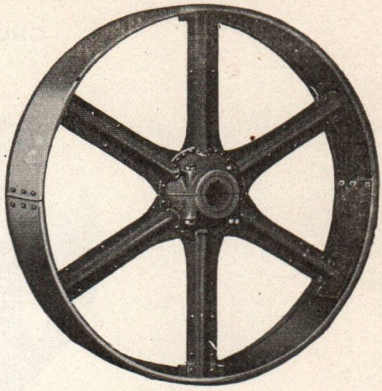


Fig. 2975B

ODD SIZE DIAMETER

Odd size diameter pulleys above 25 inches, add 25 per cent to next higher list.

WIDTH OF FACE.—Only even inches in width are made above 5-inch face.

EXTRA BUSHINGS.—To avoid mistake when ordering, state first the size of shaft, and then give the size of pulley for which bushing is intended, and length of hub of pulley or state bore, and then use symbol to denote outside diameter and length of bushing.

Pulley Diameter Inches	Regular Bore Inches	Special Bore Inches	Additional Price for Special or Large Bores	Bushings		
				Outside Diameter Inches	Length Inches	Symbol
6 to 7, Incl.	2 7/16	Pulleys 18 to 60,	Quoted on Application	2 7/16	3	F
8 " 20, "	3 1/2	Incl., can have		3 1/2	3 5/8	G
21 " 34, "	3 1/2	Hubs 4 7/16, 6 1/2,		3 1/2	6 1/4	H
*36 " 48, "	3 1/2	8 1/2 inches, at		4 7/16	6 1/4	I
48 " 60, "	4 7/16	an Extra		6 1/2	6 1/2	J
62 and Larger	4 7/16, 6 1/2, 8 1/2	Charge		8 1/2	7 1/2	K

*For 8-inch and over, takes 4 7/16-inch.

Diameter Inches	Width of Face, Inches									
	2	3	4	5	6	8	10	12	14	16
6	3.15	3.30	3.45	3.75	4.05	4.60	5.20	5.90	....	....
7	3.22	3.38	3.60	3.90	4.20	4.80	5.40	6.10	....	....
8	3.30	3.45	3.75	4.05	4.35	4.95	5.60	6.25	....	....
9	3.38	3.60	3.90	4.20	4.50	5.10	5.75	6.35	....	....
10	3.45	3.75	4.05	4.35	4.65	5.25	5.90	6.45	....	....
11	3.65	3.90	4.20	4.50	4.80	5.40	6.00	6.90	....	....
12	3.90	4.20	4.63	4.80	5.33	5.78	6.45	7.65	9.00	10.25
13	4.05	4.35	4.80	5.20	5.62	6.43	7.20	8.40	9.50	10.75
14	4.20	4.50	5.20	5.65	6.15	7.05	8.03	9.00	10.00	11.25
15	....	4.65	5.45	5.80	6.55	7.65	8.80	9.75	10.75	12.00
16	....	4.95	5.75	6.10	6.90	8.25	9.45	10.50	11.50	12.65
17	....	5.25	6.00	6.50	7.28	8.78	10.05	11.25	12.40	13.65
18	....	5.55	6.38	7.00	7.65	9.30	10.65	12.00	13.25	14.50
19	....	5.80	6.75	7.50	8.25	10.13	11.25	12.90	14.20	15.60
20	....	6.00	7.50	8.10	9.00	10.73	12.00	14.25	15.30	16.90
21	....	6.25	8.00	8.90	9.60	11.25	12.98	15.60	18.00	20.55
22	....	6.50	8.55	9.50	10.28	12.00	14.10	16.80	19.50	21.30
23	....	7.00	8.70	9.90	10.58	12.60	14.75	18.00	21.00	24.30

ONEIDA PRESSED STEEL SPLIT PULLEYS

Diameter Inches	Width of Face, Inches								
	3	4	5	6	8	10	12	14	16
24	7.50	8.90	10.00	10.95	13.20	15.68	19.05	22.65	26.25
25	....	9.20	10.25	11.45	13.80	16.40	20.20	24.50	29.25
26	....	9.55	10.50	11.95	14.40	17.10	21.30	26.25	31.20
28	....	10.80	11.70	12.90	15.45	18.15	22.90	28.50	34.50
30	....	12.00	12.90	14.10	17.25	19.90	24.75	31.50	38.10
32	....	13.20	14.10	15.45	19.35	22.50	26.85	34.15	41.65
34	....	14.40	15.75	17.25	21.75	25.50	30.00	36.75	45.00
36	....	15.90	17.85	19.50	24.00	28.65	33.75	39.75	48.60
38	....	19.50	20.65	21.75	26.40	31.05	37.15	42.75	51.75
40	....	21.00	22.75	24.00	28.50	33.75	40.15	46.50	55.15
42	....	23.25	24.85	26.25	32.25	37.50	43.50	50.25	57.75
44	....	....	....	29.25	35.62	41.25	47.25	54.00	61.12
46	....	....	....	33.00	39.00	45.00	50.25	57.75	64.50
48	....	....	....	36.75	42.00	48.75	54.00	61.50	67.50
50	....	....	....	40.87	47.25	53.25	58.50	66.00	75.00
52	....	....	....	46.50	51.00	57.00	63.00	69.00	78.75
54	....	....	....	50.25	56.25	61.50	67.50	74.25	83.25
56	....	....	....	54.00	60.75	66.75	72.75	80.25	90.00
58	....	....	....	60.00	65.25	71.25	78.37	86.62	96.37
60	....	....	....	63.75	70.50	77.25	84.00	93.00	102.75
62	....	....	....	....	72.85	84.30	95.95	107.55	119.95
64	....	....	....	....	76.50	88.20	100.10	111.95	124.60
66	....	....	....	....	80.25	92.20	104.35	116.45	129.35
68	....	....	....	....	84.15	96.35	108.75	121.10	134.25
70	....	....	....	....	88.10	100.70	113.55	126.35	139.95
72	....	....	....	....	92.15	105.05	118.15	131.30	145.40
74	....	....	....	....	96.35	109.65	123.20	136.85	151.50
76	....	....	....	....	100.65	114.30	128.35	142.55	157.75
78	....	....	....	....	105.05	119.15	133.70	148.45	164.20
80	....	....	....	....	109.60	124.25	139.35	154.65	170.95
82	....	....	....	....	114.25	129.45	145.10	160.95	177.90
84	....	....	....	....	119.00	134.75	150.95	167.40	184.95
86	....	....	....	....	123.90	140.25	157.10	174.20	192.40
88	....	....	....	....	128.90	145.85	163.35	181.05	199.90
90	....	....	....	....	.....	151.70	169.85	188.20	207.65
92	....	....	....	....	.....	157.75	176.55	195.70	215.85
94	....	....	....	....	.....	163.85	183.45	203.20	223.95
96	....	....	....	....	.....	170.15	190.55	210.95	232.35
98	....	....	....	....	.....	176.60	197.85	219.10	241.20
100	....	....	....	....	.....	181.50	203.20	224.90	247.45
102	....	....	....	....	.....	186.40	208.45	230.50	253.40
104	....	....	....	....	.....	191.35	213.85	236.30	259.55
106	....	....	....	....	.....	196.95	220.00	243.05	266.95
108	....	....	....	....	.....	203.40	226.90	250.45	274.90
110	....	....	....	....	.....	210.00	234.00	258.05	283.05
112	....	....	....	....	.....	216.85	241.45	266.15	291.75
114	....	....	....	....	.....	.....	248.90	274.15	300.30
116	....	....	....	....	.....	.....	256.50	282.30	309.00
118	....	....	....	....	.....	.....	264.20	290.50	317.65
120	....	....	....	....	.....	.....	271.95	298.70	326.40

ONEIDA STEEL PULLEYS

SPECIAL INFORMATION

CHART SHOWING KIND AND NUMBER OF CENTERS, STANDARD BORES AND LENGTH THROUGH HUBS

Width Face

Diameters	2	3	4	5	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
6		"F" hub 2 7/16" bore				SF	SF	SF		c												
7		Hub 3" long				6 3/4"	8 3/4"	10 3/4"														
8																						
9	2 7/16 bore																					
10	SF																					
11	2 3/8"					GG	GG	GG														
12						7/8"	9 1/2"	11 1/2"														
13		Single "G" Hub							GG	GG												
14																						
15			3 1/2 bore																			
16		Hub 3 1/2" long						GGG	GGG	GGG												
17								11 1/2"	13 1/2"	15 1/2"												
18																						
19																						
20																						
21																						
22									GG	GG												
23					Single "H" hub				11 1/2"	13 1/2"												
24					3 1/2 bore						15 1/2"	17 1/2"										
25					Hub 6 1/4" long																	
26										Double "H" hubs												
28								GG														
30	NOT							9"	HH	HH	HH	HH										
32	REGULARLY MADE								14 1/4"	16 1/4"	18 1/4"	20 1/4"	HHH	HHH	HHH	HHH	HHH	HHH				
34													23"	25"	27"	29"	31"	33"				
36																						
38																						
40				H																		
42				6 1/4"																		
44										Double "I" hubs												
46						Single "I" hub														Quadruple		
48						4 7/16 bore														"I" hubs		
50						Hub 6 1/4" long																
52									II	II	II	II	II	II	Triple "I" hubs					IIII	IIII	IIII
54									15"	17"	19"	21"	23"	25"						37"	37"	37"

SCHEDULE OF SPECIALS AND EXTRAS ONEIDA STEEL SPLIT PULLEYS

PRICES, SPECIAL BORES OR HUBS

Price, Pulleys. under 26-inch Diameter, Fitted with I Hubs..... ..extra per hub **2.50**
" Pulleys, 26 to 30-in. Diam., having Faces 3, 4, 5, 6 and 8 Inches Wide, Fitted with I Hubs " " **3.00**
Pulleys, 26 to 30-inch diameter, having faces wider than 8 inches, and all diameters over 30 inches, no extra charge for I hubs.
Price, Pulleys, 60-in. Diam. and Under, Fitted with J Hubs, 6½-in. Bore.extra per hub **5.00**
" " 60-in. " " " " " K Hubs..... " " **7.50**
" " Any Diam. Fitted with O 8-arm, High Flange Malleable Hubs, 4 7/16-in. Bore... " " **12.00**
" " Under 96-in. Diam. Fitted with P 8-arm, High Flange Malleable Hubs, 8½-in. Bore " " **15.00**

REVISED LIST EXTRA BUSHINGS

	F, G, H,	I	J	K	*LN
Bushings.....					
Price.....each	.60	1.20	4.00	6.00	.30

*For National pulleys.

KEY-SEATING BUSHINGS

Size Bore.....inches	1 to 3	3 1/8 to 4 7/16	Over 4 7/16
Price.....each	.30	.40	.50

REVISED EXTRA CHARGES FOR SPECIAL CONSTRUCTION

Price, Double Flange Pulleys.....add to regular list 20%
" Odd Sizes Over 25-inch Diameter..... " " " " 25%

DODGE SAFETY COLLARS

SOLID

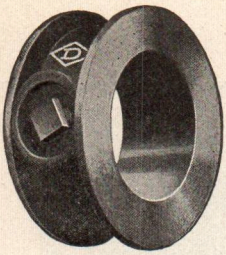


Fig. 5122A

SPLIT

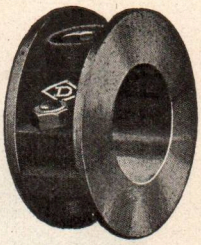


Fig. 5122B

These collars are made solid and split for all sizes of shafting, and comply with all the legal requirements as to safety by having set screws and bolts protected.

SOLID

Size Shaft Inches	Price Each	Size Shaft Inches	Price Each	Size Shaft Inches	Price Each
15/16	.65	3 11/16	3.30	6 7/16	10.10
1 3/16	.80	3 15/16	3.60	6 11/16	10.90
1 7/16	1.00	4 3/16	4.15	6 15/16	11.70
1 11/16	1.20	4 7/16	4.70	7 1/2	14.05
1 15/16	1.40	4 11/16	5.30	8	16.20
2 3/16	1.60	4 15/16	5.90	8 1/2	18.45
2 7/16	1.80	5 3/16	6.55	9	20.70
2 11/16	2.10	5 7/16	7.20	9 1/2	23.10
2 15/16	2.40	5 11/16	7.90	10	25.75
3 3/16	2.70	5 15/16	8.60	....	.....
3 7/16	3.00	6 3/16	9.35	....	.....

SPLIT

Size Shaft Inches	Price Each	Size Shaft Inches	Price Each	Size Shaft Inches	Price Each
15/16	.95	3 11/16	4.95	6 7/16	15.15
1 3/16	1.20	3 15/16	5.40	6 11/16	16.35
1 7/16	1.50	4 3/16	6.25	6 15/16	17.55
1 11/16	1.80	4 7/16	7.05	7 1/2	21.10
1 15/16	2.10	4 11/16	7.95	8	24.25
2 3/16	2.40	4 15/16	8.85	8 1/2	27.65
2 7/16	2.70	5 3/16	9.80	9	31.05
2 11/16	3.15	5 7/16	10.80	9 1/2	34.70
2 15/16	3.60	5 11/16	11.85	10	38.65
3 3/16	4.05	5 15/16	12.90	....	.....
3 7/16	4.50	6 3/16	14.05	....	.....

Finished and polished on periphery and faced on ends.

HALLOWELL COLD-ROLLED STEEL SHAFT COLLARS

WITH SAFETY SET SCREW

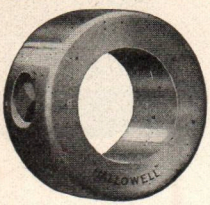


Fig. 7375A

WITH STANDCO HOLLOW SET SCREW

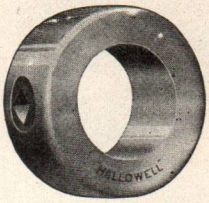


Fig. 7375B

The Hallowell Collar, made of cold-rolled steel, costs *less* than common cast iron collars, in spite of the fact that it is made of superior material. It is highly polished all over and positively will not crack. The set screw cannot possibly strip the threads in the collar. It can be made to hug the shaft as tightly as if made in one piece with it — in other words, it can never work loose. It is a safety — which means that the set screw is harmless, by not projecting.

Size of Bore Inches	Outside Diam. Inches	Width Inches	Price Each	Size of Bore Inches	Outside Diam. Inches	Width Inches	Price Each
3/16	7/16	1/4	.17	1 3/8	2 3/16	1	.95
1/4	1/2	5/16	.17	1 7/16	2 5/16	1 1/8	1.00
5/16	5/8	3/8	.18	1 1/2	2 5/16	1 1/8	1.05
3/8	3/4	3/8	.22	1 9/16	2 1/2	1 1/8	1.10
7/16	7/8	7/16	.35	1 5/8	2 1/2	1 1/8	1.15
1/2	1	1/2	.40	1 11/16	2 11/16	1 3/16	1.20
9/16	1	9/16	.46	1 3/4	2 11/16	1 3/16	1.25
5/8	1 1/8	5/8	.46	1 13/16	2 15/16	1 5/16	1.30
11/16	1 1/4	11/16	.50	1 7/8	2 15/16	1 5/16	1.35
3/4	1 1/4	11/16	.50	1 15/16	3 1/16	1 3/8	1.40
13/16	1 5/16	3/4	.60	2	3 1/16	1 3/8	1.45
7/8	1 5/8	7/8	.60	2 3/16	3 9/16	1 3/8	1.60
15/16	1 5/8	7/8	.62	2 1/4	3 9/16	1 3/8	1.65
1	1 5/8	7/8	.65	2 7/16	3 13/16	1 3/8	1.80
1 1/16	1 13/16	15/16	.70	2 1/2	3 13/16	1 3/8	1.88
1 1/8	1 13/16	15/16	.75	2 11/16	4 1/8	1 3/8	2.10
1 3/16	2	1	.80	2 3/4	4 1/8	1 3/8	2.17
1 1/4	2	1	.85	2 15/16	4 3/8	1 3/8	2.40
1 5/16	2 3/16	1	.90	3	4 3/8	1 3/8	2.48

We can, when requested, furnish collars larger than 3-inch made of cast iron. Prices and sizes on application.

Split collars on application.

DODGE SHAFT COUPLINGS

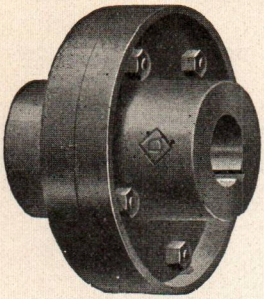


Fig. 5123A

FLANGE COUPLINGS

These couplings are finished all over, key-seated and keys furnished; they have finished bolts fitted to reamed holes.

The use of flange couplings gives a line shaft the best possible alignment which can be secured and maintained. So-called male and female couplings can be furnished at an additional charge of 10 per cent, which extra also applies to the cost of fitting.

INCLUDING KEYS

Size of Shaft Inches	Price, Each: For Couplings and Keys not Fitted	Price, Each: For Keyseating Shafting Fitting and Facing Coupling on Same	Total Price Fitted to Shaft Complete	Size of Shaft Inches	Price, Each: For Couplings and Keys not Fitted	Price, Each: For Keyseating Shafting Fitting and Facing Coupling on Same	Total Price Fitted to Shaft Complete
1 3/16	7.50	3.75	11.25	4 15/16	54.75	11.50	66.25
1 7/16	8.00	4.00	12.00	5 7/16	67.00	13.00	80.00
1 11/16	8.50	4.25	12.75	6	81.00	14.50	95.50
1 15/16	9.00	4.50	13.50	6 1/2	95.50	16.50	112.00
2 3/16	10.50	4.75	15.25	7	110.00	18.50	128.50
2 7/16	12.50	5.25	17.75	7 1/2	126.00	21.00	147.00
2 11/16	15.25	5.75	21.00	8	142.00	24.00	166.00
2 15/16	18.25	6.25	24.50	8 1/2	160.00	27.00	187.00
3 3/16	21.75	7.00	28.75	9	179.00	30.00	209.00
3 7/16	25.25	7.75	33.00	9 1/2	199.00	34.00	233.00
3 11/16	29.25	8.50	37.75	10	220.00	38.00	258.00
3 15/16	33.25	9.50	42.75	10 1/2	243.00	42.00	285.00
4 3/16	38.25	10.00	48.25	11	270.00	46.00	316.00
4 7/16	43.25	10.50	53.75	11 1/2	305.00	50.00	355.00
4 11/16	49.00	11.00	60.00	12	350.00	55.00	405.00

Reducing couplings are charged at the rate of the larger size shaft of the pair, plus 10%.

RIBBED COMPRESSION COUPLINGS

A moderate priced coupling for medium service and complies with all legal requirements as to safety by having bolt heads and nuts protected.

Finished and polished on periphery and faced on ends.

This coupling, when securely clamped to the shaft without key, develops remarkable driving efficiency.

If ordered in large quantities liberal discounts will be quoted.

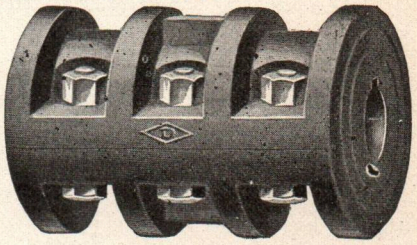


Fig. 5123B

INCLUDING KEYS

Size of Shaft Inches	Price Each	Size of Shaft Inches	Price Each	Size of Shaft Inches	Price Each
1 3/16	3.C5	2 3/16	9.00	3 3/16	16.50
1 7/16	4.30	2 7/16	10.00	3 7/16	20.00
1 11/16	6.30	2 11/16	11.00	3 11/16	24.00
1 15/16	7.40	2 15/16	13.00	3 15/16	28.00

Reducing couplings are charged at the rate of the larger size shaft of the pair, plus 10%.

SHAW GENUINE COMPRESSION COUPLINGS

SINGLE COMPRESSION

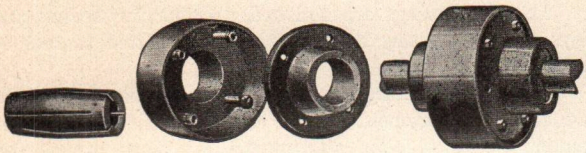


Fig. 10825A

DOUBLE COMPRESSION

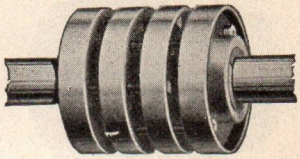


Fig. 10825B

SINGLE COMPRESSION

The shafting is securely held by the compression exerted by drawing tapered rings together, with bolts, on a tapered cast iron slotted sleeve. No keyseats, set screws or expensive fitting and facing required.

Size of Shaft, Inches	Outside Diameter Inches	Length of Sleeve, Inches	Total Length Coupling, In.	Price Each
7/8, 15/16, 1	4 9/16	3 5/8	3 3/4	4.25
1 1/16, 1 1/8, 1 3/16, 1 1/4	4 3/4	3 3/4	3 7/8	4.75
1 5/16	5	4 1/4	4 3/8	5.00
1 3/8, 1 7/16, 1 1/2	5 1/4	5	5 1/8	5.50
1 9/16, 1 5/8, 1 11/16, 1 3/4	5 5/8	5 5/8	5 3/4	6.25
1 13/16, 1 7/8, 1 15/16, 2	7 1/8	7 3/8	7 1/4	8.00
2 1/16, 2 1/8, 2 3/16, 2 1/4	7 3/8	8	8 1/8	9.00
2 5/16, 2 3/8, 2 7/16, 2 1/2	7 3/4	8 3/4	8 7/8	10.75
2 9/16, 2 5/8, 2 11/16, 2 3/4	8	9 1/8	9 1/4	13.00
2 13/16, 2 7/8, 2 15/16, 3	8 1/2	10	10 1/8	16.00

DOUBLE COMPRESSION

These couplings are constructed with four separate flanges instead of two, the alternating flanges being bolted together.

The alternating flanges being bolted together give these couplings an even and positive grip.

Size of Shaft, Inches	Outside Diameter Inches	Length of Sleeve, Inches	Total Length Coupling, In.	Price Each
2 13/16, 2 7/8, 2 15/16, 3	9 1/4	11	11 1/8	27.25
3 1/16, 3 1/8, 3 3/16, 3 1/4	9 1/2	11 1/2	11 5/8	32.50
3 5/16, 3 3/8, 3 7/16, 3 1/2	9 7/8	12	12 1/8	39.25
3 9/16, 3 5/8, 3 11/16, 3 3/4	10 1/8	12 1/2	12 5/8	45.25
3 13/16, 3 7/8, 3 15/16, 4	11 1/16	13	13 1/8	51.25
4 1/16, 4 1/8, 4 3/16, 4 1/4	11 3/4	13 1/2	13 5/8	61.50
4 5/16, 4 3/8, 4 7/16, 4 1/2	11 3/4	14	14 1/8	71.75
4 9/16, 4 5/8, 4 11/16, 4 3/4	....	16	16 1/8	83.00
4 13/16, 4 7/8, 4 15/16, 5	12 3/4	16	16 1/8	94.00
5 1/16, 5 1/8, 5 3/16, 5 1/4	....	18	18 1/8	102.50
5 5/16, 5 3/8, 5 7/16, 5 1/2	13 1/8	18	18 1/8	111.00
5 9/16, 5 5/8, 5 11/16, 5 3/4	....	22	22 1/8	120.50
5 13/16, 5 7/8, 5 15/16, 6	14 1/4	22	22 1/8	130.00

Reducing couplings advance 20 per cent on above prices. The larger shaft which the coupling fits determines the size.

DODGE ADJUSTABLE BALL AND SOCKET DROP AND POST HANGERS

WITH STANDARD AND SELF-OILING BEARINGS WITH REMOVABLE DOUBLE BRACE LINKS

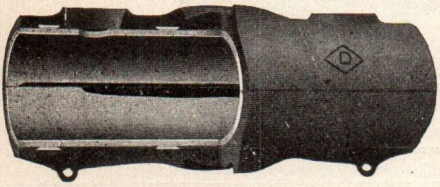
PLUNGER SCREW

The cupped ends of the plunger screws in the hanger frame give the true ball and socket support for the box. The oval form of the ball bosses and the clearance between the box and the hanger jaw sides give perfect freedom of movement for the box through wide angles from normal position. The sides of the oval bosses fit snugly against the plunger screws and allow the box no motion of rotation with the turning shaft.

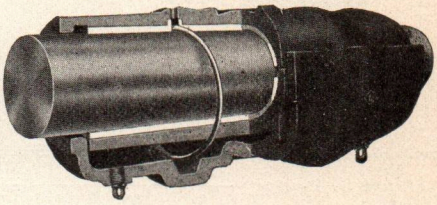
Plunger screws are of large diameter, giving good bearing on the bosses of the box. The ends are cupped in spherical form to fit the bosses. Threads on the screws and in the hanger frame are machine cut, for correct fitting. Set screws tapped into the sides of the frame serve to lock the plunger screws for permanence of adjustment.

DODGE SHAFT BEARINGS—PLAIN AND SELF-OILING

PLAIN



RING



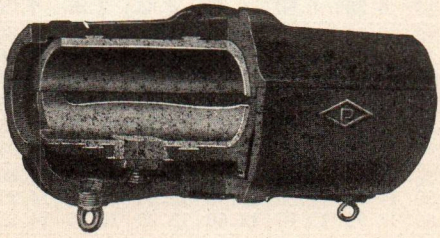
PLAIN

An inexpensive bearing for general service. Furnished in all sizes up to 6 inches inclusive.

RING

Driven by the friction of its own weight a continuous supply of oil is maintained from reservoir to top of shaft from whence it flows over entire bearing surface. Sizes up to 6 inches, inclusive.

CAPILLARY



A self-oiling bearing, providing lubrication to shaft according to demands of service. Is fed from oil reservoir below the shaft by capillary attraction. Sizes up to 4 inches inclusive.

DODGE ADJUSTABLE BALL AND SOCKET DROP HANGERS

WITH STANDARD AND SELF-OILING BEARINGS

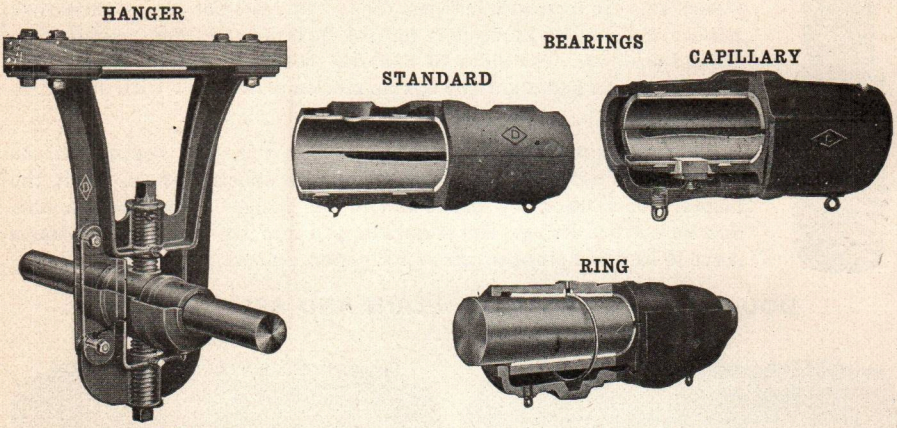


Fig. 9117A

Size of Shaft Inches	Bearing	Price, Each—Drop, Inches									
		8	10	12	14	16	18	20	24	30	36
15/16	Standard	3.85	4.00	4.20	4.45	....	....	....	....	....	....
	Capillary	4.80	4.95	5.15	5.40	....	....	....	....	....	....
1 3/16	Standard	3.95	4.10	4.30	4.55	....	....	....	....	....	....
	Capillary	4.95	5.10	5.30	5.55	....	....	....	....	....	....
	Ring	5.15	5.30	5.50	5.75	....	....	....	....	....	....
1 7/16	Standard	4.90	5.05	5.25	5.50	5.60	6.00	6.45	....	....	....
	Capillary	5.70	5.85	6.05	6.30	6.40	6.80	7.25	....	....	....
	Ring	5.90	6.05	6.25	6.50	6.60	7.00	7.45	....	....	....
1 11/16	Standard	5.00	5.15	5.35	5.60	5.70	6.10	6.55	....	....	....
	Capillary	5.95	6.10	6.30	6.55	6.65	7.05	7.50	....	....	....
	Ring	6.15	6.30	6.50	6.75	6.85	7.25	7.70	....	....	....
1 15/16	Standard	6.85	7.35	7.50	7.80	8.05	8.30	8.80	9.65	....	....
	Capillary	8.75	9.25	9.40	9.70	9.95	10.20	10.70	11.55	....	....
	Ring	9.00	9.50	9.65	9.95	10.20	10.45	10.95	11.80	....	....
2 3/16	Standard	8.70	9.05	9.20	9.70	10.30	10.75	11.65	13.35	15.70	18.25
	Capillary	10.70	11.05	11.20	11.70	12.30	12.75	13.65	15.35	17.70	20.25
	Ring	10.95	11.30	11.45	11.95	12.55	13.00	13.90	15.60	17.95	20.50
2 7/16	Standard	9.35	9.70	9.85	10.35	10.95	11.40	12.30	14.00	16.35	18.90
	Capillary	11.30	11.65	11.80	12.30	12.90	13.35	14.25	15.95	18.30	20.85
	Ring	11.60	11.95	12.10	12.60	13.20	13.65	14.55	16.25	18.60	21.15
2 11/16	Standard	10.85	11.35	11.85	12.35	13.35	14.45	15.50	17.75	19.80	20.55
	Capillary	13.45	13.95	14.45	14.95	15.95	17.05	18.10	20.35	22.40	23.15
	Ring	13.80	14.30	14.80	15.30	16.30	17.40	18.45	20.70	22.75	23.50

DODGE ADJUSTABLE BALL AND SOCKET DROP HANGERS

WITH STANDARD AND SELF-OILING BEARING

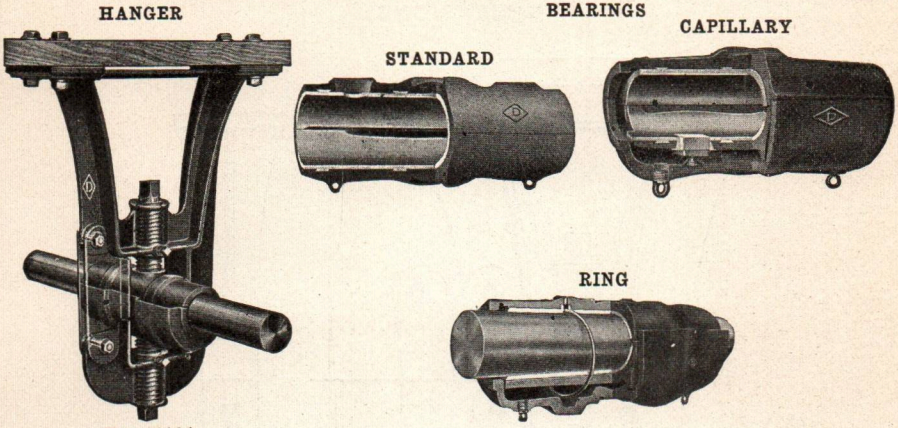


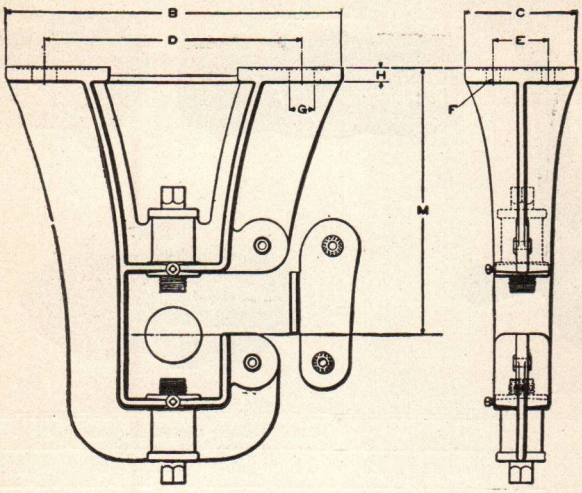
Fig. 9118A

Size of Shaft Inches	Bearing	Price, Each—Drop, Inches									
		8	10	12	14	16	18	20	24	30	36
2 15/16	Standard	12.80	13.30	13.80	14.30	15.30	16.40	17.45	19.70	21.75	22.50
	Capillary	16.20	16.70	17.20	17.70	18.70	19.80	20.85	23.10	25.15	25.90
	Ring	16.55	17.05	17.55	18.05	19.05	20.15	21.20	23.45	25.50	26.25
3 3/16	Standard	....	16.40	16.95	17.70	18.20	19.60	21.50	24.70	27.80	30.30
	Capillary	....	24.70	25.25	26.00	26.50	27.90	29.80	33.00	36.10	38.60
	Ring	....	25.10	25.65	26.40	26.90	28.30	30.20	33.40	36.50	39.00
3 7/16	Standard	....	16.85	17.40	18.15	18.65	20.05	21.95	25.15	28.25	30.75
	Capillary	....	27.05	27.60	28.35	28.85	30.25	32.15	35.35	38.45	40.95
	Ring	....	27.55	28.10	28.85	29.35	30.75	32.65	35.85	38.95	41.45
3 11/16	Standard	....	21.85	23.40	23.90	26.05	26.80	28.70	33.95	37.40	41.95
	Capillary	....	30.45	32.00	32.50	34.65	35.40	37.30	42.55	46.00	50.55
	Ring	....	31.00	32.55	33.05	35.20	35.95	37.85	43.10	46.55	51.10
3 15/16	Standard	....	26.10	26.65	27.15	29.30	30.05	31.95	37.20	40.65	45.20
	Capillary	....	32.20	33.75	34.25	36.40	37.15	39.05	44.30	47.75	52.30
	Ring	....	32.80	34.35	34.85	37.00	37.75	39.65	44.90	48.35	52.90
4 3/16	Standard	....	....	....	30.75	32.70	34.95	37.20	42.45	45.25	51.20
	Ring	....	....	....	38.20	40.15	42.40	44.65	49.90	52.70	58.65
4 7/16	Standard	....	....	....	32.00	33.95	36.20	38.45	43.70	46.50	52.45
	Ring	....	....	....	40.95	42.90	45.15	47.40	52.65	55.45	61.40
4 11/16	Standard	....	....	....	....	39.35	43.05	45.30	48.90	53.10	61.20
	Ring	....	....	....	....	50.60	54.30	56.55	60.15	64.35	72.45
4 15/16	Standard	....	....	....	....	42.40	46.10	48.35	51.95	56.15	64.25
	Ring	....	....	....	....	55.75	59.45	61.70	65.30	69.50	77.60

DODGE ADJUSTABLE BALL AND SOCKET DROP HANGERS

WITH STANDARD AND SELF-OILING BEARINGS

DIMENSIONS



Size of Shaft Inches	Dimensions, Inches											
	M	B	C	D	E	Bolt F	G	H	L	N	O	P
15/16 to 1 1/4	8	10 3/4	3 1/2	8 3/8	....	1/2	1	9/16	2 5/16	4 1/4	2 3/8	1 1/4
	10	12	3 7/8	9 5/8	....	1/2	1	9/16	2 5/16	4 1/4	2 3/8	1 1/4
	12	13 1/4	4 1/4	10 3/4	....	1/2	1	5/8	2 5/16	4 1/4	2 3/8	1 1/4
	14	15	4 3/4	12 1/2	....	1/2	1	5/8	2 5/16	4 1/4	2 3/8	1 1/4
17/16 to 1 3/4	8	13 3/8	4 1/8	10 3/8	....	1/2	1	5/8	3	4 7/8	3 1/8	1 1/4
	10	14 1/2	4 1/4	11 5/8	....	1/2	1	5/8	3	4 7/8	3 1/8	1 1/4
	12	16 1/8	4 5/8	12 1/2	....	1/2	1	9/16	3	4 7/8	3 1/8	1 1/4
	14	17 5/8	4 5/8	13 7/8	....	1/2	1	5/8	3	4 7/8	3 1/8	1 1/4
	16	18 3/4	5 3/8	15 1/2	....	5/8	1 1/4	11/16	3	4 7/8	3 1/8	1 1/4
	18	20 3/4	5 1/4	17 1/4	....	5/8	1 1/4	11/16	3	4 7/8	3 1/8	1 1/4
	20	20 7/8	5 1/4	17 1/4	....	5/8	1 1/4	3/4	3	4 7/8	3 1/8	1 1/4
1 15/16 to 2	8	14 1/2	4 1/8	11 1/4	....	5/8	1 1/4	9/16	3 9/16	5 1/8	3 5/16	1 1/2
	10	15	4 3/8	11 7/8	....	5/8	1 1/4	5/8	3 9/16	5 1/8	3 5/16	1 1/2
	12	15 7/8	4 7/8	12 3/4	....	5/8	1 1/4	11/16	3 9/16	5 1/8	3 5/16	1 1/2
	14	17 1/2	4 3/4	13 5/8	....	5/8	1 1/4	3/4	3 9/16	5 1/8	3 5/16	1 1/2
	16	19	4 7/8	15 7/8	....	5/8	1 1/4	3/4	3 9/16	5 1/8	3 5/16	1 1/2
	18	21 7/8	4 7/8	17 1/4	....	3/4	1 1/2	3/4	3 9/16	5 1/8	3 5/16	1 1/2
	20	23 1/4	5 3/8	19	....	3/4	1 1/2	3/4	3 9/16	5 1/8	3 5/16	1 1/2
	24	22 7/8	5 3/4	19 3/8	....	3/4	1 1/2	3/4	3 9/16	5 1/8	3 5/16	1 1/2
2 3/16 to 2 1/2	8	16 3/8	4 7/8	13	....	5/8	1 1/4	5/8	4 1/8	6 1/2	3 5/8	1 1/2
	10	17	5	13 3/4	....	5/8	1 1/2	5/8	4 1/8	6 1/2	3 5/8	1 1/2
	12	18 1/4	5 1/4	14 3/4	....	5/8	1 3/8	5/8	4 1/8	6 1/2	3 5/8	1 1/2
	14	18 1/2	5 5/8	14 1/4	2 1/2	3/4	1 7/8	3/4	4 1/8	6 1/2	3 5/8	1 1/2
	16	19 3/4	6 1/4	15 3/4	3 1/4	3/4	1 7/8	3/4	4 1/8	6 1/2	3 5/8	1 1/2
	18	21 1/2	6 1/4	17 3/4	3 1/2	3/4	1 7/8	7/8	4 1/8	6 1/2	3 5/8	1 1/2

DODGE ADJUSTABLE BALL AND SOCKET DROP HANGERS

WITH STANDARD AND SELF-OILING BEARINGS

DIMENSIONS

Size of Shaft Inches	Dimensions, Inches											
	M	B	C	D	E	Bolt F	G	H	L	N	O	P
2 3/16 to 2 1/2	20	23 1/8	6 5/8	18 1/2	3 1/8	3/4	1 7/8	1	4 1/8	6 1/2	3 5/8	1 1/2
	24	26 7/8	7 7/8	21 1/4	4 1/4	3/4	2 1/2	1	4 1/8	6 1/2	3 5/8	1 1/2
	30	26 5/8	8 1/2	20 7/8	4 1/2	3/4	2 3/8	1	4 1/8	6 1/2	3 5/8	1 1/2
	36	30 1/4	8 1/2	24 3/4	4 1/2	7/8	2 1/2	1	4 1/8	6 1/2	3 5/8	1 1/2
2 11/16 to 3	8	15 1/2	5 1/4	12	2 7/8	5/8	1 3/4	3/4	4 7/8	7 1/2	4 1/4	2
	10	16 1/4	5 1/4	12 1/8	2 3/4	5/8	1 7/8	3/4	4 7/8	7 1/2	4 1/4	2
	12	17	6	13 1/4	3	5/8	1 5/8	7/8	4 7/8	7 1/2	4 1/4	2
	14	17 7/8	6	13 1/2	3 1/4	3/4	1 7/8	7/8	4 7/8	7 1/2	4 1/4	2
	16	19 5/8	6 1/4	15 3/4	3 1/4	3/4	1 7/8	7/8	4 7/8	7 1/2	4 1/4	2
	18	21 5/8	6 1/4	17 1/2	3 3/8	3/4	1 7/8	1	4 7/8	7 1/2	4 1/4	2
	20	24 3/8	7 5/8	19 1/4	4 1/8	7/8	2 1/2	1	4 7/8	7 1/2	4 1/4	2
	24	28 7/8	8 5/8	23 3/8	5	7/8	2 1/2	1 1/8	4 7/8	7 1/2	4 1/4	2
	30	29 1/2	9	23 1/8	4 1/4	7/8	2 5/8	1 1/8	4 7/8	7 1/2	4 1/4	2
	36	32 1/2	9 1/4	26	4 1/2	1	2 1/2	1 1/8	4 7/8	7 1/2	4 1/4	2
3 3/16 to 3 1/2	10	17	6 1/4	14	3 1/4	7/8	1 3/4	1	5 3/4	8 5/8	4 11/16	2 1/2
	12	18 1/8	6 5/8	14 1/4	3 5/8	7/8	1 3/4	1	5 3/4	8 5/8	4 11/16	2 1/2
	14	20	6 5/8	15 5/8	3 3/8	7/8	1 7/8	1	5 3/4	8 5/8	4 11/16	2 1/2
	16	20 1/2	6 5/8	16 1/2	3 3/8	7/8	1 3/4	1	5 3/4	8 5/8	4 11/16	2 1/2
	18	23 1/2	8 1/8	18 5/8	4 3/4	7/8	2 1/4	1 1/8	5 3/4	8 5/8	4 11/16	2 1/2
	20	27	8 3/4	21 3/4	5	7/8	2 1/2	1 1/8	5 3/4	8 5/8	4 11/16	2 1/2
	24	28 1/4	8 3/4	24 1/2	5 3/4	7/8	2 3/4	1 1/8	5 3/4	8 5/8	4 11/16	2 1/2
	30	30 3/8	8 3/4	25	5	1	2 3/8	1 1/8	5 3/4	8 5/8	4 11/16	2 1/2
	36	35 7/8	9 1/4	30 1/2	5 5/8	1 1/8	2 3/8	1 1/8	5 3/4	8 5/8	4 11/16	2 1/2
3 11/16 to 4	10	20	7	15 1/2	3 1/2	7/8	2	1	6 3/8	9	5 3/8	2 1/2
	12	19 7/8	7 5/8	15	4 1/4	7/8	1 7/8	1	6 3/8	9	5 3/8	2 1/2
	14	22	7 1/2	17 1/8	4 1/4	7/8	1 7/8	1	6 3/8	9	5 3/8	2 1/2
	16	24 3/4	8 1/8	17 7/8	4 3/8	1	2 3/4	1	6 3/8	9	5 3/8	2 1/2
	18	25 7/8	8 1/8	20 1/8	4 3/8	1	2 3/4	1 1/8	6 3/8	9	5 3/8	2 1/2
	20	27	9 1/8	21	5	1	2 1/2	1 1/8	6 3/8	9	5 3/8	2 1/2
	24	31 7/8	10	25 3/4	5 7/8	1	2 5/8	1 1/8	6 3/8	9	5 3/8	2 1/2
	30	35 7/8	10 3/4	28 1/2	5 5/8	1 1/8	3 1/8	1 1/4	7 3/4	10	5 1/2	2 3/4
	36	40 1/8	12	32 1/4	7	1 1/8	2 3/4	1 1/4	6 3/8	9	5 3/8	2 1/2
4 3/16 to 4 1/2	14	23 1/2	8 1/4	16 3/4	5	1	3 3/4	1	7 3/4	10	5 1/2	2 3/4
	16	24 3/4	8 3/4	18 1/2	5 1/4	1	3 3/4	1	7 3/4	10	5 1/2	2 3/4
	18	26 1/4	8 3/4	20	5 5/8	1	3 5/8	1 1/8	7 3/4	10	5 1/2	2 3/4
	20	27 1/2	9 1/4	21 1/4	5 3/4	1	3 1/2	1 1/8	7 3/4	10	5 1/2	2 3/4
	24	30	10	23 1/4	5 7/8	1	3 1/2	1 1/4	7 3/4	10	5 1/2	2 3/4
	30	35 7/8	10 3/4	28 1/2	5 5/8	1 1/8	3 1/8	1 1/4	7 3/4	10	5 1/2	2 3/4
4 11/16 to 5	16	26 3/4	9 1/2	20 5/8	4 7/8	1 1/8	2 1/2	1 3/8	7 7/8	10 1/4	5 3/4	2 3/4
	18	27 3/4	10 3/4	21	6	1 1/8	2 3/4	1 3/8	7 7/8	10 1/4	5 3/4	2 3/4
	20	28 1/2	10 3/4	21 3/4	6 1/4	1 1/8	2 3/4	1 3/8	7 7/8	10 1/4	5 3/4	2 3/4
	24	30 7/8	11	24	5 7/8	1 1/8	3	1 3/8	7 7/8	10 1/4	5 3/4	2 3/4
	30	38 1/8	12	31 1/8	7 1/8	1 1/8	3 1/8	1 3/8	7 7/8	10 1/4	5 3/4	2 3/4
5 7/16 to 6	16	28 1/2	10 3/8	22 1/2	5 3/4	1 1/8	2 5/8	1 3/8	9 1/8	11 1/2	6 7/8	2 3/4
	20	20 3/4	12	23 3/4	6 3/4	1 1/8	3 1/2	1 3/8	9 1/8	11 1/2	6 7/8	2 3/4
	30	40 1/4	14	30 1/4	7 5/8	1 1/4	4	1 3/8	9 1/8	11 1/2	6 7/8	2 3/4

DODGE ADJUSTABLE BALL AND SOCKET POST HANGERS

WITH STANDARD AND SELF-OILING BEARINGS

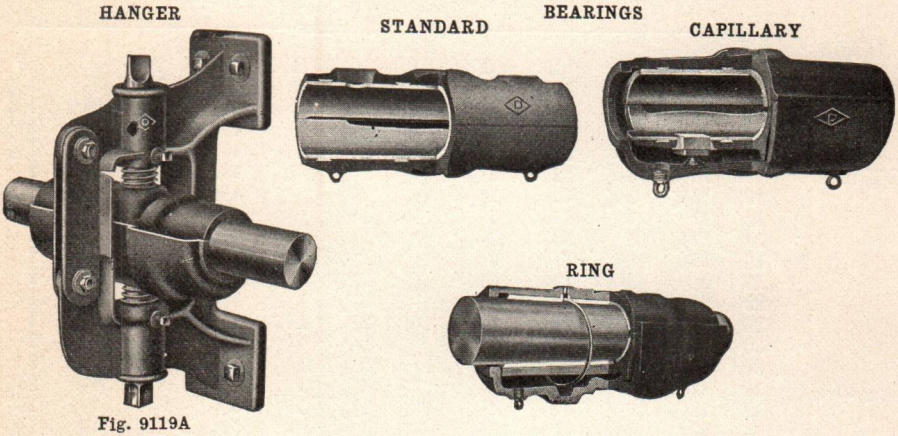


Fig. 9119A

STANDARD BEARINGS

Size of Shaft.inches	15/16	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16
Price.....each	**4.40**	**4.50**	**5.50**	**5.60**	**7.15**	**9.75**	**10.40**	**13.00**	**14.95**
Size of Shaft.inches	3 3/16	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16	.....
Price.....each	**19.00**	**19.45**	**25.45**	**28.70**	**32.85**	**34.10**	**43.35**	**46.40**	.....

CAPILLARY BEARINGS

Size of Shaft.....inches	15/16	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16
Price.....each	**5.35**	**5.50**	**6.30**	**6.55**	**9.05**	**11.75**	**12.35**
Size of Shaft.....inches	2 11/16	2 15/16	3 3/16	3 7/16	3 11/16	3 15/16	.....
Price.....each	**15.60**	**18.35**	**27.30**	**29.65**	**34.05**	**35.80**	.....

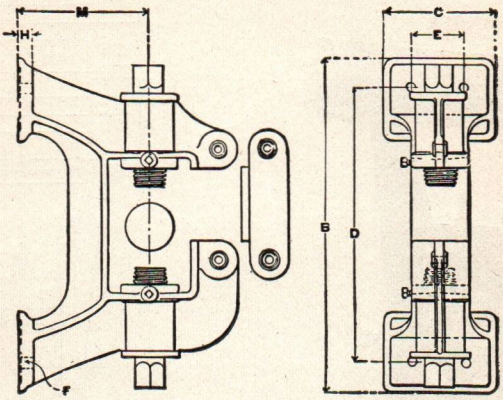
RING BEARINGS

Size of Shaft.....inches	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16
Price.....each	**5.70**	**6.50**	**6.75**	**9.30**	**12.00**	**12.65**	**15.95**	**18.70**
Size of Shaft.....inches	3 3/16	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16
Price .....each	**27.70**	**30.15**	**34.60**	**36.40**	**40.30**	**43.05**	**54.60**	**59.75**

DODGE ADJUSTABLE BALL AND SOCKET POST HANGERS

WITH STANDARD AND SELF-OILING BEARINGS

DIMENSIONS



Frame Symbol	Shaft, Size Inches	M	B	C	D	E
B	15/16 to 1 1/4	6	12 3/4	3 1/2	11 1/4	...
D	1 7/16 " 1 3/4	6	15	4	13 1/8	...
E	1 15/16 " 2	5 7/8	17 1/2	4 3/8	15 1/2	...
G	2 3/16 " 2 1/2	6 1/8	19 1/2	5 1/4	15 3/8	2 3/8
K	2 11/16 " 3	6 1/2	20 5/8	6	16 5/8	3 1/8
M	3 3/16 " 3 1/2	8	21	7	17	3 3/4
O	3 11/16 " 4	8 1/4	21 1/2	8	17 1/8	4
R	4 3/16 " 4 1/2	8 1/4	25 1/2	9	20 3/8	5
T	4 11/16 " 5	8 3/4	27	10	21 3/8	5 3/4
W	5 7/16 " 6	9 1/2	30 1/4	10 5/8	23 1/8	5 1/4

Frame Symbol	Number and Size of Bolts at F	G	H	L	N	O	P	R
B	Two 5/8	...	5/8	2 1/2	4 1/4	2 1/2	1 1/4	3 3/8
D	Two 5/8	...	5/8	3	4 7/8	3	1 1/4	4
E	Two 5/8	...	3/4	3 3/4	5 1/8	3 1/8	1 1/2	4 3/8
G	Four 5/8	...	7/8	4 1/8	6 1/2	3 5/8	1 1/2	4 7/8
K	Four 3/4	...	3/4	5	7 1/2	4 3/8	2	5 1/8
M	Four 7/8	...	7/8	5 3/4	8 1/4	5 1/8	2 1/2	5 1/8
O	Four 7/8	...	1	6 3/8	9	5 1/4	2 1/2	5 1/4
R	Four 7/8	2 1/4	1	7	9 3/8	5 1/2	2 3/4	5 7/8
T	Four 1	2 5/8	1 1/8	8	10	6	2 3/4	6 3/4
W	Four 1 1/8	...	1 3/8	9 1/8	11 1/2	6 3/4	2 3/4	7

"PIONEER" STEEL SHAFT HANGERS

PATENTED AND PATENTS PENDING

WITH STANDARD BEARINGS

HANGER

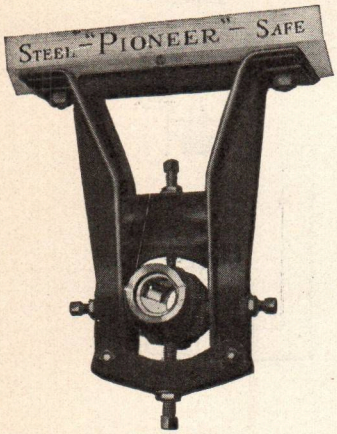
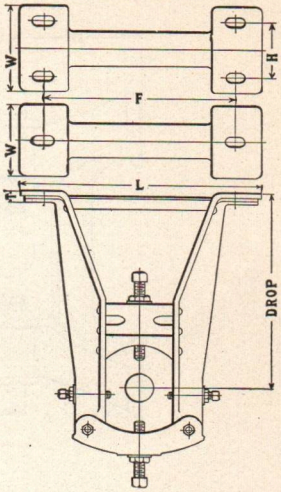


Fig. 7414A

DIMENSIONS



Size of Shaft Inches	Drop Inches	Price Each	Dimensions, Inches					Bolts	
			F	L	T	W	H	Number	Size Inches
15/16	5½ to 6¼	5.00	10¾	13	7/16	3¾	...	2	⅝
	7 " 9	5.00	10¼	12½	7/16	5¼	...	2	⅝
	10 " 12	5.40	12½	15¼	½	5½	...	2	⅝
	14 " 16	6.15	14⅛	16¾	½	5½	...	2	⅝
	18 " 20	7.00	17⅜	20	½	5½	...	4	½
1 3/16	5½ " 6¼	5.00	10¾	13	7/16	3¾	...	2	⅝
	7 " 9	5.00	10¼	12½	7/16	5¼	...	2	⅝
	10 " 12	5.40	12½	15¼	½	5½	...	2	⅝
	14 " 16	6.15	14⅛	16¾	½	5½	...	2	⅝
	18 " 20	7.00	17⅜	20	½	5½	...	4	½
1 7/16	5½ " 6¼	5.30	10¾	13	7/16	3¾	...	2	⅝
	7 " 9	5.30	10¼	12½	7/16	5¼	...	2	⅝
	10 " 12	5.70	12½	15¼	½	5½	...	2	⅝
	14 " 16	6.45	14⅛	16¾	½	5½	...	2	⅝
	18 " 20	7.30	17⅜	20	½	5½	...	4	½
1 11/16	5½ " 6¼	6.10	10¾	13	7/16	3¾	...	2	⅝
	7 " 9	6.10	10¼	12½	7/16	5¼	...	2	⅝
	10 " 12	6.50	12½	15¼	½	5½	...	2	⅝
	14 " 16	7.25	14⅛	16¾	½	5½	...	2	⅝
	18 " 20	8.10	17⅜	20	½	5½	3 1/16	4	½
	22 " 24	11.55	20 3/16	23⅝	½	6½	4	4	⅝
	28 " 30	15.00	23⅞	27⅞	½	7½	4	4	⅝

Dimensions may vary slightly from those given.

"PIONEER" STEEL SHAFT HANGERS

PATENTED AND PATENTS PENDING

(CONTINUED)

WITH STANDARD BEARINGS

Size of Shaft Inches	Drop Inches	Price Each	Dimensions, Inches					Bolts	
			F	L	T	W	H	Number	Size Inches
1 15/16	5 1/2 to 6	6.95	10 3/4	13	7/16	3 3/4	....	2	5/8
	7 " 9	6.95	10 1/4	12 1/2	7/16	5 1/4	....	2	5/8
	10 " 12	7.35	12 1/2	15 1/4	1/2	5 1/2	....	2	5/8
	14 " 16	8.10	14 1/8	16 3/4	1/2	5 1/2	....	2	5/8
	18 " 20	8.95	17 3/8	20	1/2	5 1/2	3 1/16	4	1/2
	22 " 24	12.40	20 3/16	23 5/8	1/2	6 1/2	4	4	5/8
	28 " 30	15.85	23 7/8	27 7/8	1/2	7 1/2	4	4	5/8
2 3/16	5 5/8 " 6	9.35	12 7/8	15 1/2	5/8	4 1/2	....	2	3/4
	7 " 9	9.35	11 1/4	14 1/8	1/2	5 1/2	....	2	3/4
	10 " 12	9.65	13 3/8	16 1/2	5/8	6 1/2	....	2	3/4
	14 " 16	10.50	15 1/8	18	5/8	6 1/2	....	2	3/4
	18 " 20	11.45	17 5/8	21	1/2	6 1/2	4	4	5/8
	22 " 24	12.70	20 3/16	23 5/8	1/2	6 1/2	4	4	5/8
	28 " 30	16.15	23 7/8	27 7/8	1/2	7 1/2	4	4	5/8
2 7/16	5 3/4 " 6 1/4	10.65	12 7/8	15 1/2	5/8	4 1/2	....	2	3/4
	7 " 9	10.65	11 1/4	14 1/8	1/2	5 1/2	....	2	3/4
	10 " 12	10.95	13 3/8	16 1/2	5/8	6 1/2	....	2	3/4
	14 " 16	11.80	15 1/8	18	5/8	6 1/2	....	2	3/4
	18 " 20	12.75	17 5/8	21	1/2	6 1/2	4	4	5/8
	22 " 24	14.00	20 3/16	23 5/8	1/2	6 1/2	4	4	5/8
	28 " 30	17.45	23 7/8	27 7/8	1/2	7 1/2	4	4	5/8
2 11/16	5 3/4 " 6 1/4	12.75	12 7/8	15 1/2	5/8	4 1/2	....	2	3/4
	7 " 9	12.75	11 1/4	14 1/8	1/2	5 1/2	....	2	3/4
	10 " 12	13.05	13 3/8	16 1/2	5/8	6 1/2	....	2	3/4
	14 " 16	13.90	15 1/8	18	5/8	6 1/2	....	2	3/4
	18 " 20	14.85	17 5/8	21	1/2	6 1/2	4	4	5/8
	22 " 24	16.10	20 3/16	23 5/8	1/2	6 1/2	4	4	5/8
	28 " 30	19.55	23 7/8	27 7/8	1/2	7 1/2	4	4	5/8
2 15/16	7 " 9	15.50	13 1/8	16 1/4	5/8	6 1/2	....	2	7/8
	10 " 12	15.50	14 7/16	18 1/16	3/4	7 1/2	....	2	7/8
	14 " 16	17.00	16 1/8	19 1/8	3/4	7 1/2	....	2	7/8
	18 " 20	19.00	19	23 1/16	5/8	7 1/2	4	4	3/4
	22 " 24	20.50	22 1/4	25 5/8	5/8	7 1/2	4	4	3/4
	28 " 30	27.50	24 3/4	34 1/4	2	8	....	2	1
3 3/16	11 " 13	20.00	17 1/8	25 1/2	2	8	....	2	1
	14 " 16	22.50	18 1/2	27 1/2	2	8	....	2	1
	18 " 20	25.00	20 7/8	30 1/8	2	8	....	2	1
	22 " 24	26.50	23 5/8	32 3/8	2	8	....	2	1
	28 " 30	28.50	24 3/4	34 1/4	2	8	....	2	1
3 7/16	11 " 13	22.00	17 1/8	25 1/2	2	8	....	2	1
	14 " 16	24.50	18 1/2	27 1/2	2	8	....	2	1
	18 " 20	27.00	20 7/8	30 1/8	2	8	....	2	1
	22 " 24	28.50	23 5/8	32 3/8	2	8	....	2	1
	28 " 30	30.50	24 3/4	34 1/4	2	8	....	2	1
3 15/16	11 " 13	26.00	17 1/8	25 1/2	2	8	....	2	1
	14 " 16	28.50	18 1/2	27 1/2	2	8	....	2	1
	18 " 20	31.00	20 7/8	30 1/8	2	8	....	2	1
	22 " 24	32.50	23 5/8	32 3/8	2	8	....	2	1
	28 " 30	34.50	24 3/4	34 1/4	2	8	....	2	1

Dimensions may vary slightly from those given.

"PIONEER"
STEEL POST AND WALL BRACKET HANGERS

PATENTED AND PATENTS PENDING

WITH STANDARD BEARINGS

HANGER

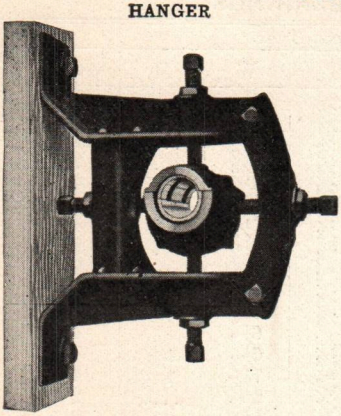
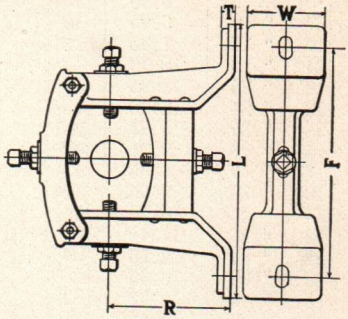


Fig. 6604A

DIMENSIONS



POST HANGERS

Size of Shaft Inches	Reach "R" Inches	Price Each	Dimensions Inches F	L	W	Number and Size of Bolts Inches	Size of Shaft Inches	Reach "R" Inches	Price Each	Dimensions Inches F	L	W	Number and Size of Bolts Inches
15/16	6	5.00	10¾	13	3¾	2—⅝	2 3/16	6	9.35	12⅞	15½	4½	2—¾
1 3/16	6	5.00	10¾	13	3¾	2—⅝	2 7/16	6	10.65	12⅞	15½	4½	2—¾
1 7/16	6	5.30	10¾	13	3¾	2—⅝	2 11/16	6¼	12.75	12⅞	15½	4½	2—¾
1 11/16	6	6.10	10¾	13	3¾	2—⅝	2 15/16	8½	15.50	13⅛	16¼	6½	2—⅞
1 15/16	6	7.30	11½	13¾	3¾	2—⅝	....	....	....	....	....	....	....

WALL BRACKET HANGERS

15/16	8½	5.50	10¼	12½	5¼	2—⅝	2 3/16	8½	9.85	11¼	14⅛	5½	2—¾
	11½	5.90	12½	15¼	5½	2—⅝		11½	10.40	13⅜	16½	6½	2—¾
	15½	6.90	14⅛	16¾	5½	2—⅝		15½	11.50	15⅛	18	6½	2—¾
	19½	8.00	17⅜	20	5½	4—½		19½	12.45	17⅝	21	6½	4—⅝
1 3/16	8½	5.50	10¼	12½	5¼	2—⅝		23½	14.70	20 3/16	23⅝	6½	4—⅝
	11½	5.90	12½	15¼	5½	2—⅝	2 7/16	8½	11.65	12¼	15⅛	5½	2—¾
	15½	6.90	14⅛	16¾	5½	2—⅝		11½	11.95	14⅜	17½	6½	2—¾
	19½	8.00	17⅜	20	5½	4—½		15½	13.80	16⅛	19	6½	2—¾
1 7/16	8½	5.80	10¼	12½	5¼	2—⅝		19½	14.75	19	22	6½	4—⅝
	11½	6.20	12½	15¼	5½	2—⅝		23½	17.00	21 3/16	24⅝	6½	4—⅝
	15½	7.20	14⅛	16¾	5½	2—⅝	2 11/16	8½	13.75	12¼	15⅛	5½	2—¾
	19½	8.30	17⅜	20	5½	4—½		11½	14.05	14⅜	17½	6½	2—¾
1 11/16	8½	6.60	10¼	12½	5¼	2—⅝		15½	15.90	16⅛	19	6½	2—¾
	11½	7.00	12½	15¼	5½	2—⅝		19½	16.85	19	22	6½	4—⅝
	15½	8.00	14⅛	16¾	5½	2—⅝		23½	19.10	21 3/16	24⅝	6½	4—⅝
	19½	9.10	17⅜	20	5½	4—½	2 15/16	11½	17.50	15 7/16	19 1/16	7½	2—⅞
1 15/16	8½	7.95	11	13¼	5¼	2—⅝		15½	20.00	17⅛	20⅛	7½	2—⅞
	11½	8.35	13¼	16	5½	2—⅝		19½	22.50	20	24 1/16	7½	4—¾
	15½	9.10	14⅞	17½	5½	2—⅝		23½	24.50	23¼	26⅝	7½	4—¾
	19½	10.45	18⅛	20¾	5½	4—½		....	....	....	....	....	....

Dimensions may vary slightly from those given.

DODGE HEAVY RIGID POST BEARINGS

STANDARD

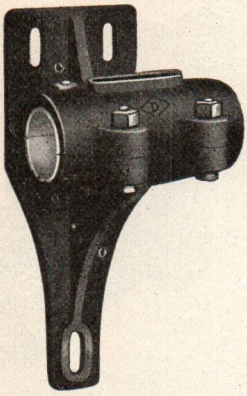


Fig. 8105A

SELF-OILING
CAPILLARY OR RING

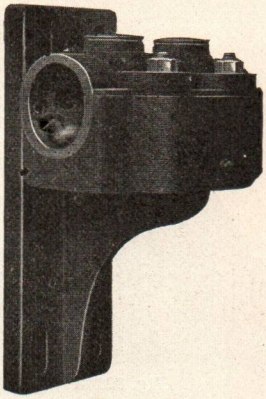


Fig. 8105B

Particularly useful in supporting heavy line shafting to posts, and where more pulley clearance is desired than is obtainable with the drop hanger.

Shafting so supported is less liable to get out of alignment than if suspended from floor beams.

Ample vertical adjustment is secured by means of elongated slots in backplate.

These bearings are made standard, capillary, and ring, and at slight additional cost will be furnished with dust-tight or closed ends.

STANDARD AND SELF-OILING

Size of Shaft Inches	Price, Each—Type of Bearing: Standard	Capillary	Ring
1 3/16	3.25	....	....
1 7/16	3.60	4.70	4.70
1 11/16	4.10	5.35	5.35
1 15/16	5.45	7.00	7.00
2 3/16	7.25	9.10	9.10
2 7/16	8.35	11.65	11.65
2 11/16	9.15	14.65	14.65
2 15/16	10.35	17.95	17.95
3 3/16	12.70	21.40	21.40
3 7/16	14.10	24.85	24.85
3 11/16	18.40	28.55	28.55
3 15/16	22.40	32.10	32.10
4 3/16	27.15	38.55	38.55
4 7/16	31.90	45.00	45.00
4 15/16	40.10	51.45	51.45
5 7/16	55.00	70.00	70.00
5 15/16	....	95.00	95.00

DODGE
SOLID JOURNAL BEARINGS AND FLAT BOXES

SOLID JOURNAL BEARING

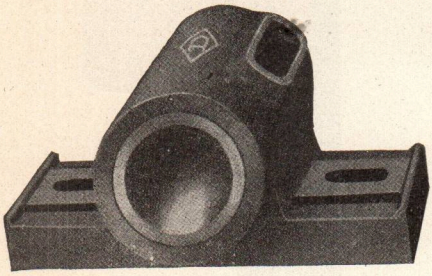


Fig. 3923A

COMMON FLAT BOX

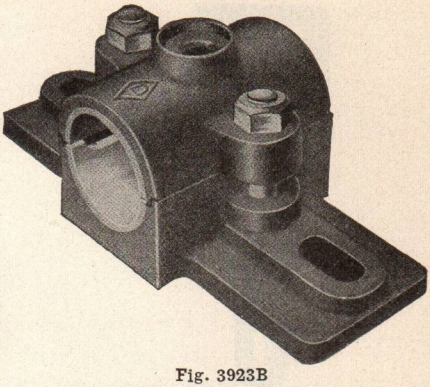


Fig. 3923B

SOLID JOURNAL BEARINGS

These bearings can be used to advantage where the power is light, speed low and small first cost an object.

They are babbitted, and the babbitt is bored and reamed to shaft sizes. Adjustment is provided for in bolt slots. Oil pocket is so placed as to permit the use of posts.

COMMON FLAT BOXES

Light in weight and strong; designed as an inexpensive bearing and for light work.

Lubrication is provided for by means of a cup reservoir in the cap. The bolt slots in base allow for side adjustment.

WICK-OILING RIGID PILLOW BLOCKS

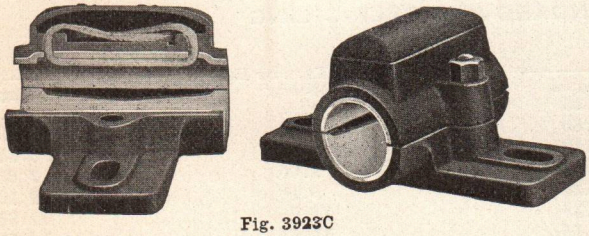


Fig. 3923C

Amply heavy and strong enough for any service they may be called upon to meet.

Lubricated through an oil reservoir in cap by means of an absorbent wick which conducts the oil to the shaft.

Size of Shaft Inches	Solid Journal Boxes Babbitted	Common Flat Boxes	Wick-oiling Rigid Pillow Blocks	Size of Shaft Inches	Solid Journal Boxes Babbitted	Common Flat Boxes	Wick-oiling Rigid Pillow Blocks
15/16	.95	1.00	....	2 11/16	3.60	4.10	7.40
1 3/16	1.20	1.35	1.80	2 15/16	4.80	5.00	9.50
1 7/16	1.50	1.65	2.30	3 3/16	5.90	6.20	11.60
1 11/16	1.80	2.00	3.00	3 7/16	7.30	7.60	13.80
1 15/16	2.10	2.30	4.00	3 11/16	9.00	9.50	.....
2 3/16	2.70	2.80	5.00	3 15/16	11.00	11.80	.....
2 7/16	3.20	3.40	6.00	...	.....	.....	.....

DODGE PILLOW BLOCKS

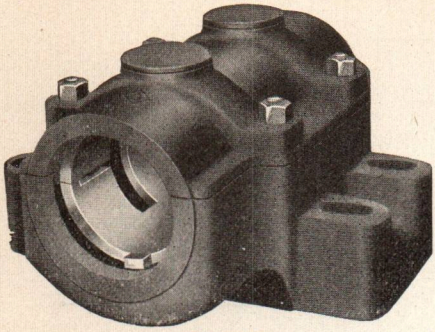


Fig. 5127A

SELF-OILING RIGID

Made in ring or capillary-oiling bearings.

They are strictly first-class and applicable for heavy duty or high speed service.

Designed so as to give a correct bearing length, base area and ample oil reservoir capacity.

All pillow blocks are carefully babbitted and bored, with ends and bases finished.

Size of Shaft.....inches	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16
Price .....each	**4.50**	**5.00**	**5.70**	**6.80**	**8.20**	**9.80**	**12.00**
Size of Shaft.....inches	2 15/16	3 3/16	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16
Price .....each	**14.00**	**18.00**	**22.00**	**27.00**	**32.00**	**37.00**	**42.00**
Size of Shaft.....inches	4 15/16	5 7/16	5 15/16	6 1/2	7	7 1/2	8
Price .....each	**54.00**	**66.00**	**80.00**	**94.00**	**108.00**	**122.00**	**136.00**
Size of Shaft.....inches	8 1/2	9	9 1/2	10	10 1/2	.....	.....
Price .....each	**150.00**	**165.00**	**180.00**	**195.00**	**210.00**	.....	.....

Capillary not made above 3 15/16-inch size.

STANDARD

UP TO 2 3/4-INCH SHAFT

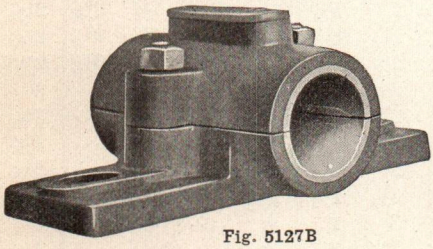


Fig. 5127B

2 3/4-INCH SHAFT AND UP

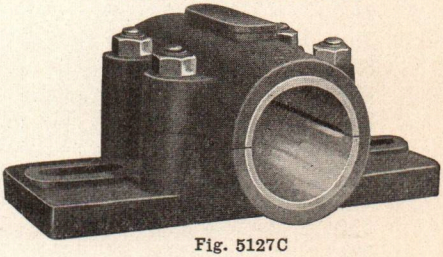
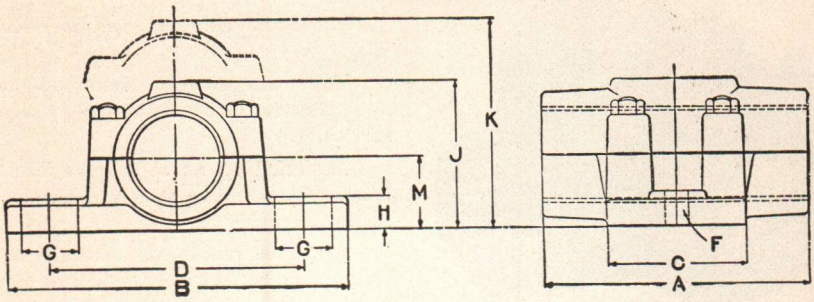


Fig. 5127C

Size of Shaft.....inches	15/16	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16
Price.....each	**1.30**	**1.60**	**2.10**	**2.70**	**3.70**	**4.60**
Size of Shaft.....inches	2 7/16	2 11/16	2 15/16	3 3/16	3 7/16	3 11/16
Price.....each	**5.50**	**7.00**	**8.80**	**11.00**	**12.80**	**14.40**
Size of Shaft.....inches	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16	5 7/16
Price.....each	**16.00**	**18.50**	**21.00**	**24.00**	**27.00**	**34.00**
Size of Shaft.....inches	5 15/16	6 1/2	7	7 1/2	8	.....
Price.....each	**43.00**	**52.00**	**61.00**	**70.00**	**80.00**	.....

DODGE PILLOW BLOCKS

STANDARD AND WICK-OILING



Size of Shaft Inches	Dimensions, Inches									To Remove Cap K Inches		Size M Inches
	A	B	C	D	*F	G	H	J				
								Std.	W. O.	Std.	W. O.	
15/16	3	6½	2	4¾	½	1	⅝	2 1/16	2 9/16	3⅛	3⅝	1
1 3/16	3¾	7¾	2¼	5⅝	⅝	1¼	¾	2 9/16	3⅛	3 15/16	4½	1¼
1 7/16	4½	8	2⅝	5⅞	⅝	1¼	13/16	2 15/16	3 9/16	4½	5⅛	1 7/16
1 11/16	5¼	8½	3	6⅜	⅝	1¼	⅞	3 5/16	4 1/16	5	5¾	1⅝
1 15/16	6	10¼	3⅜	7 11/16	¾	1½	⅞	3 11/16	4 7/16	5½	6¼	1 11/16
2 3/16	6¾	10⅜	3¾	7⅞	¾	1½	1	4⅛	4 15/16	6¼	7 1/16	2
2 7/16	7½	10¾	4	8¼	¾	1½	1 1/16	4⅜	5 5/16	6⅝	7 9/16	2⅛
2 11/16	8¼	11½	4⅜	8⅝	¾	1¾	1⅛	4¾	5 13/16	6⅞	7 15/16	2 5/16
2 15/16	9	12⅛	4¾	9⅛	¾	2	1 3/16	5⅛	6 5/16	7⅜	8 9/16	2½
3 3/16	9¾	12⅞	5⅛	9⅝	⅞	2⅛	1¼	5½	6¾	8¼	9½	2 11/16
3 7/16	10½	13½	5½	10	⅞	2¼	1 5/16	5⅞	7 3/16	8¾	10 1/16	2⅞
3 11/16	11¼	14¼	5¾	10¾	⅞	2⅜	1⅜	6 3/16	....	9⅛	....	3
3 15/16	12	15	6⅛	11	⅞	2½	1 7/16	6 9/16	....	9⅝	....	3 3/16
4 3/16	13	16	6½	11¼	1⅛	3¼	1¼	7	....	9⅞	....	3⅜
4 7/16	13½	16	6¾	12	1	2¾	1½	7 5/16	....	10 5/16	....	3⅝
4 15/16	15¼	17¼	7¼	12½	1⅛	3¼	1½	8⅛	....	11½	....	3¾
5 7/16	16⅞	17¾	7¼	13¼	1¼	3	1¾	8¾	....	12½	....	4⅛
5 15/16	18¼	19⅝	8	15	1¼	3¼	1⅞	9⅝	....	13⅝	....	4½
6 7/16	18⅞	20	8½	15	1¼	3¼	2⅛	10 5/16	....	14 11/16	....	5
6 15/16	19¼	20¼	9	15½	1⅜	3	2⅜	11 1/16	....	15 11/16	....	5¼
7 7/16	19¾	21½	9½	16¼	1⅜	3¼	2½	11⅞	....	16⅞	....	6
7 15/16	24	23¾	9⅝	19⅛	1½	3¼	2⅝	12 9/16	....	17 13/16	....	6⅝
8 7/16	24	23½	10⅝	17¾	1¾	3¼	2⅝	13¼	....	18⅞	....	6¼
9 15/16	30	27⅜	11⅜	22¼	1¾	3½	3 5/16	15⅜	....	21⅞	....	8¼
10 7/16	31	27¾	14	22	1¾	3½	3	15¼	....	22	....	7½
11 15/16	36	31	13	24⅝	2	4	4	18½	....	26¼	....	10

*Bolt.

DODGE BELT TIGHTENERS

IRON FRAME

CLASS B

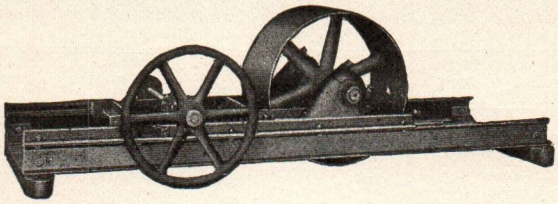


Fig. 5408A

Used most commonly for vertical belt drives and is so made (with a combination steel and iron frame), that when setting on the floor it makes a very rigid and efficient device for taking up the slack and maintaining the necessary tension on the belt.

The bearings are ring-oiling, of a true ball and socket type, and are carried in the pulley frame, that is cast in one piece with a rack on either side; whereby the adjustment is obtained by means of the pinions on the hand wheel shaft.

The pulleys furnished on these tighteners are regularly balanced for a speed of 400 revolutions per minute. If a higher speed is required, an extra charge will be made for the special balance.

Number	00-B	0-B	1-B	2-B	3-B	4-B
Diameter of Pulley .....inches	12	18	24	28	36	42
Face " " ..... "	9	12	14	20	28	38
Length of Adjustment ..... "	16	20	23	40	46	58
Price.....each	**78.00**	**110.00**	**150.00**	**250.00**	**400.00**	**520.00**

The above price is for belt-tightener complete with an iron pulley of size shown.

CLASS C

This tightener is generally employed on horizontal drives, and is mounted vertically between wooden posts as shown in the illustration. The bearings are of the ring-oiling, spherical ball and socket type. The pulley is iron. The adjustment is secured through the rack and pinion and hand wheel.

The pulleys furnished on these tighteners are regularly balanced for a speed of 400 revolutions per minute. If a higher speed is required, an extra charge will be made for the special balance.

Number .....inches	00-C	0-C	1-C
Diam. of Pulley .... "	12	18	24
Face " " .... "	9	12	14
Length of Adjustment "	16	20	23
Price.....each	**62.50**	**87.50**	**120.00**

Number .....inches	2-C	3-C	4-C
Diam. of Pulley .... "	28	36	42
Face " " .... "	20	28	38
Length of Adjustment "	40	46	58
Price.....each	**200.00**	**320.00**	**415.00**

The above price list is for tightener complete with iron pulley of size shown. It does not include the wooden structure.

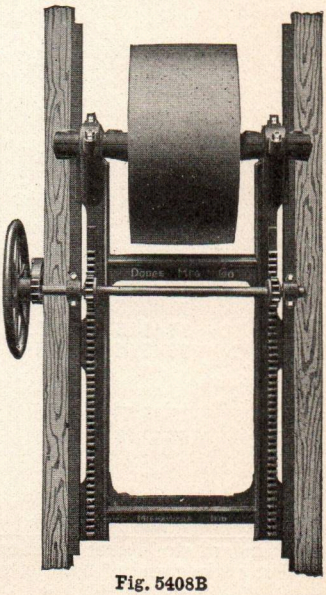


Fig. 5408B

DETACHABLE LINK BELTING

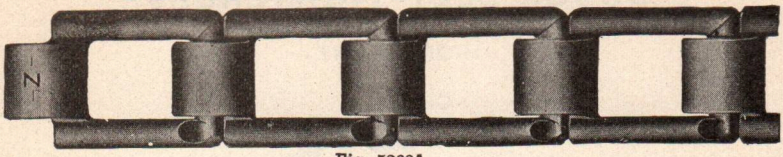


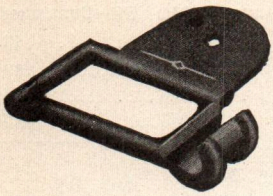
Fig. 5260A

Chain Number	Works on Sprocket No.	*Working Strength Pounds	Price Pl. Chain Per Foot	Price Couplers Per Pair	Chain Number	Works on Sprocket No.	*Working Strength Pounds	Price Pl. Chain Per Foot	Price Couplers Per Pair
7	**	365	.29	....	62½	62	515	.29	....
22	**	55	.27	....	063	52	400	.31	.28
23	**	75	.20	....	64	**	490	.29	....
024	**	115	.18	....	65	**	410	.21	....
025	**	110	.18	....	**66**	**66**	**435**	**.26**	**.25**
25	**25-31**	**115**	**.15**	**.15**	**67**	**57-67-77**	**550**	**.26**	**.25**
027	**	115	.17	.16	71	**	780	.40	....
29	**	225	.31	....	071½	**	900	.40	....
31	25-31	100	.19	....	71½	**	560	.36	.38
32	**32**	**185**	**.15**	**.18**	072	62	725	.41	.37
32½	**	275	.20	....	72	**	705	.33	....
33	**33-34**	**200**	**.15**	**.17**	072½	**	715	.42	....
34	**33-34**	**215**	**.15**	**.17**	72½	62	1000	.43	.38
34½	**	190	.18	....	73	**	565	.40	....
35	**35-45-55**	**200**	**.15**	**.20**	075	**	765	.37	....
Brtsh 36	**	250	.33	....	**75**	**75-78-88**	**665**	**.27**	**.21**
36½	**	205	.19	....	75½	**	650	.29	....
37	**	205	.15	....	76	**	590	.39	....
38	**	210	.15	....	76½	**	650	.30	.25
4-Bar 39	**	365	.30	....	**77**	**57-67-77**	**600**	**.33**	**.25**
042	42	250	.20	....	77½	**	765	.44	....
42	**42**	**250**	**.17**	**.21**	**78**	**75-78-88**	**815**	**.38**	**.28**
3-Bar 43	**	385	.32	.54	**83**	**83-93**	**825**	**.39**	**.36**
44	**	265	.16	.20	**85**	**85-94-95**	**1265**	**.49**	**.49**
45	**35-45-55**	**265**	**.15**	**.20**	**88**	**75-78 88**	**960**	**.48**	**.31**
47	35-45-55	285	.18	....	88½	75-78-88	1200	.68	.51
48	**	275	.17	.22	89	**	915	.64	....
50	**	315	.20	.20	93	89-93	1250	.54	.49
051	**	300	.30	....	94	85-94-95	1800	.88	....
51	**51**	**315**	**.21**	**.20**	**95**	**85-94-95**	**1450**	**.59**	**.60**
51½	**	375	.33	....	101	**	1255	.66	.63
052	52	385	.27	.20	**103**	**103**	**1600**	**.74**	**.64**
52	**52**	**385**	**.20**	**.18**	104½	**	1400	1.02	1.03
Hvy 52½	52	480	.29	.22	105	105	1150	.60	.77
K per 53	**	365	.22	....	**108**	**108-110**	**1650**	**.70**	**.87**
54	**	315	.20	....	**110**	**108-110**	**2115**	**.82**	**1.02**
055	35-45-55	350	.21	....	L 111	35-45-55	200	.20	....
55	**35-45-55**	**365**	**.18**	**.18**	**114**	**114**	**1835**	**.94**	**.93**
K per 55	35-45-55	365	.20	....	115	**	2115	1.15	....
55½	**	340	.22	....	116½	**	2110	1.28	....
056	**	430	.30	....	117	**	2400	1.24	....
057	35-45-55	320	.21	....	118	**	1835	1.32	....
57	**57-67-77**	**465**	**.20**	**.21**	**122**	**122**	**2500**	**1.25**	**1.74**
58	**	375	.22	....	123	**	2215	1.41	....
59	**	367	.29	....	**124**	**124**	**2115**	**1.14**	**1.31**
062	62	550	.31	....	130	**	3095	1.90	1.74
62	**62**	**515**	**.25**	**.25**	146	146	2335	1.13	1.42

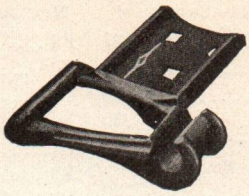
Standard stock sizes are shown in bold face type, other sizes made to order only.
*For chain speed of 200 feet per minute. **Sprocket wheels made to order.

ATTACHMENTS FOR LINK CHAIN BELTING

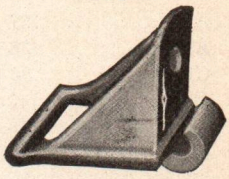
A1



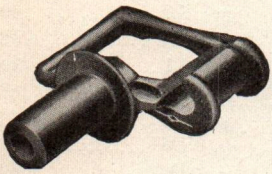
A3



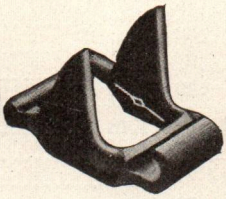
C1



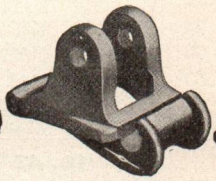
D5



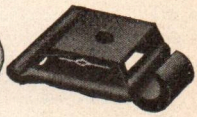
L2



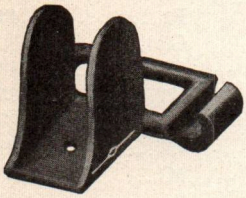
M3



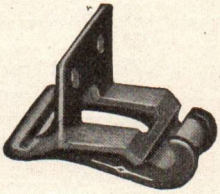
E1



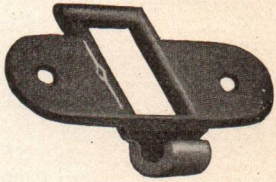
A14



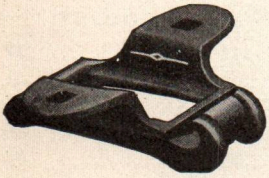
F2



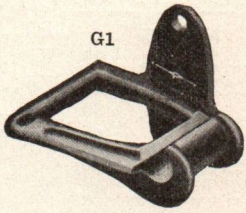
K5



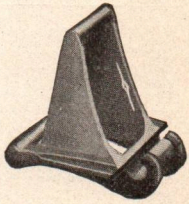
K1



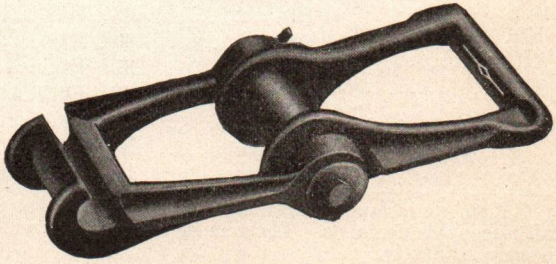
G1



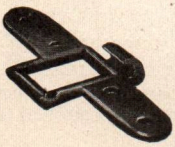
H1



COUPLING LINK



K6



JEFFREY DETACHABLE LINK CHAIN

STANDARD ATTACHMENTS—PRICE LIST, PER FOOT

NO. 25

A1	.27
A3	**.28**
C1	**.36**
D3	.32
E1	.27
E11	.20
G1	.35
H2	.35
K1	**.32**
K5	.29
K6	.36
M1	.33
S1	.33

NO. 32

A1	.30
A3	**.27**
C1	**.40**
D3	.33
E1	.27
ED	.72
G1	.31
K1	**.37**
K5	.29
K6	.47
M1	.40

No. 33

A1	.21
D5	.25
E1	.22
G1	.27
H1	.29
K1	.31
K3	.48
K5	.31
K6	.43
L2	.29
M1	.36
S1	.31

No. 34

A1	.27

No. 34—Continued

C1	.41
C2	.46
K1	.36
L1	.30

No. 35

A1	.29
A2	.40
C1	.40
D5	.33
E1	.31
K1	.40
K5	.37
S1	.33

NO. 42

A1	**.29**
A3	.43
A22	.22
C1	**.39**
E1	.27
G27	.49
K1	**.36**
K3	.50
K5	.32
K6	.50
S1	.33

NO. 45

A1	**.25**
A3	**.35**
A14	.39
C1	.33
C9	.35
C15	.42
C20	.47
C27	.47
D3	.42
D5	**.40**
D42	.31
D43	.37
E1	.27
E2 Special	.30
E4	.22

NO. 45—Continued

F2	**.33**
G1	**.29**
G27	.40
H2	.43
I3	.37
K1	**.32**
K1 Coupler, pair	.39
K3	.42
K5	**.31**
K34	.32
K40	**.53**
K44	.33
K48	.42
L2	.28
L3	.30
M1	.31
S1	.29
S5	.30
S6	.30
No. 22 Scraper, each	.10
No. 27 Scraper, each	.13

No. 51

A1	.31
C1 Special	.46
C14	.64
D5	.53
K1	.40
K5	.41
S1	.35

NO. 52

A1	**.35**
A3	.42
A19½	.60
C1	.41
D11	.39
E1	.41
E3	.39
F2	**.53**
G1	.40
K Special	.35

NO. 52—Continued

K1	**.43**
K5	.40
K9	.47
M1	.37

NO. 55

A1	.31
A2	.40
A3	**.40**
A41	.52
C1	**.39**
C8	.55
D5	**.43**
D41	.93
D42	.42
E1	.31
F2	**.43**
G19	.39
G27	.43
K1	**.35**
K5	.37
L2	.31
M1	.36
S1	.31
S5	.37

NO. 57

A1	**.37**
A3	.41
A15	.47
D5	.46
E1	.33
EA1	.48
EA2	.41
F2	**.53**
G1	.50
H2	**.54**
K1	**.43**
M3	.51
S2	.40
V3	.41

Plain chains and attachments in heavy-faced type are carried in factory stock to meet all reasonable demands. Those in light-faced type will be furnished as required subject to occasional delays.

JEFFREY DETACHABLE LINK CHAIN

STANDARD ATTACHMENTS—PRICE LIST, PER FOOT

No. 62

A1	**.40**
A3	**.42**
A12	.48
C1	**.48**
D5	**.55**
G27	.48
I3	.53
K1	**.43**
KS3	.55
K1 Socket	.77
K5	.41
S1	.40

No. 66

C1	.49
F2	.55
K1	.52

No. 67

A1	**.40**
A19½	.66
D5	.53
E1	.46
F2	**.59**
FF	.60
G1	**.61**
H1	.61
K1	**.49**

No. 75

D5 Special	.55
F2	.64
G1	.62
H1	.55
H4	.76
K1	.48
R1	.36
R2	.36
R9	.44
R10	.50

No. 77

A1	**.46**
A23	.60
D5	**.52**
E1	.47
F2	**.79**
G1	.59
G6	**.63**
H1	.59
K1	**.52**
K3	.66
M3	.66
R3	.44
S2	.48

No. 78

A1	.57
A3	**.72**
A11	**.61**
A63	.75
D5	.80
D12	1.06
E1	**.58**
F2	**.85**
FF	.90
G1	.72
G6	**.83**
G19	.81
H2	**.85**
H6	1.39
K1	**.58**
M3	**.85**
R1	**.52**
R1½	.54

No. 83

D5	.82
F2	1.13
FF	1.07
G1	.91

No. 83—Continued

G19	.81
G24	.91
K1	.77
M3	.92

No. 85

F2	**1.13**
F8	1.29
G6	.87
H1	.88
K2	**.88**

No. 88

A3	**.85**
A11	**.73**
D5	.82
E3	.68
F2	**.97**
F8	1.08
G1	.81
G6	**.90**
G19	**.99**
H1	**.93**
K1	**.75**
M3	**1.05**
R1	**.63**
R2	**.63**

No. 95

F2	1.34
K2	1.03

No. 103

A1	**1.12**
A4	1.15
A4 Special	1.22
A11	**1.12**
D5	1.25
DD	1.70
F2	**1.36**
F2 Coupler, each	1.54

No. 103—Continued

F8	**1.53**
G6	**1.38**
G19	**1.32**
H2	1.25
H14	**1.64**
K1	**1.16**
L2	1.53
M3	**1.41**
M11	1.18

No. 104½

F2	1.71
K2	1.57

No. 108

F2	**1.43**
K2	**1.25**

No. 114

A5	1.49
DD	1.89
F8	**1.62**
K1	1.48
K2	**1.54**
L2	1.79
N1	1.56

No. 122

K2	2.02

No. 124

DD	1.76
F2	**1.87**
F8	**2.24**
G6	**1.92**
K1	**1.90**
KM3	2.49
L2	1.64
M3	1.93
R2	1.49

Plain chains and attachments in heavy-faced type are carried in factory stock to meet all reasonable demands. Those in light-faced type will be furnished as required, subject to occasional delays.

SPROCKET WHEELS
BORED AND SET-SCREWED OR KEY-SEATED

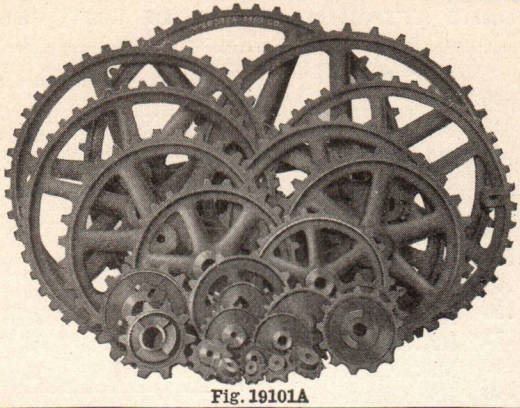


Fig. 19101A

Nos. 25, 31 *Bore $1\frac{7}{16}$ Inches

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
$1\frac{3}{4}$	6	1.60	....
2	7	1.60	....
$2\frac{1}{4}$	8	1.60	2.90
$2\frac{1}{2}$	9	1.65	2.95
3	10	1.70	3.00
$3\frac{1}{4}$	11	1.70	3.00
$3\frac{1}{2}$	12	1.75	3.05
$3\frac{3}{4}$	13	1.75	3.05
4	14	1.80	3.10
$4\frac{1}{4}$	15	1.80	3.10
$4\frac{1}{2}$	16	1.85	3.20
5	17	1.90	3.25
$5\frac{1}{4}$	18	1.90	3.25
$5\frac{1}{2}$	19	1.95	3.30
6	21	2.05	3.40
$6\frac{1}{4}$	22	2.10	3.45
$7\frac{1}{2}$	26	2.30	3.70
8	28	2.40	3.80
$8\frac{3}{4}$	30	2.50	3.90
9	32	2.60	4.00
$10\frac{1}{4}$	36	2.90	4.35
12	42	3.35	4.85
$13\frac{3}{4}$	48	3.75	5.30
16	56	4.35	6.00
$18\frac{1}{4}$	64	5.00	6.70
20	70	5.50	7.25

No. 32 *Bore $1\frac{7}{16}$ Inches

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
$2\frac{1}{4}$	6	1.65	....
$2\frac{1}{2}$	7	1.65	....
3	8	1.70	3.05
$3\frac{1}{4}$	9	1.75	3.10

No. 32—Continued

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
$3\frac{3}{4}$	10	1.80	3.15
4	11	1.85	3.25
$4\frac{1}{2}$	12	1.90	3.30
$4\frac{3}{4}$	13	1.95	3.35
$5\frac{1}{4}$	14	2.00	3.40
$5\frac{3}{4}$	16	2.10	3.55
$6\frac{1}{4}$	17	2.15	3.60
$7\frac{1}{2}$	20	2.30	3.75
$7\frac{3}{4}$	21	2.40	3.95
8	22	2.45	4.00
$8\frac{3}{4}$	24	2.60	4.15
$9\frac{1}{4}$	25	2.70	4.25
$9\frac{1}{2}$	26	2.80	4.40
11	30	3.15	4.75
$11\frac{3}{4}$	32	3.30	4.95
14	38	3.90	5.60
$16\frac{1}{4}$	44	4.45	6.30

Nos. 33, 34 *Bore $1\frac{7}{16}$ Inches

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
$2\frac{3}{4}$	6	1.70	....
$3\frac{1}{4}$	7	1.75	....
$3\frac{1}{2}$	8	1.80	3.25
4	9	1.85	3.30
$4\frac{1}{2}$	10	1.90	3.35
5	11	2.00	3.50
$5\frac{1}{2}$	12	2.05	3.55
$6\frac{1}{4}$	14	2.20	3.70
$6\frac{3}{4}$	15	2.30	3.80
$7\frac{1}{4}$	16	2.40	3.95
$8\frac{1}{2}$	19	2.60	4.15
$9\frac{3}{4}$	22	2.90	4.55
$10\frac{3}{4}$	24	3.10	4.75

Nos. 33, 34—Continued

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
12	27	3.45	5.15
$14\frac{1}{4}$	32	4.00	5.85
16	36	4.45	6.40
$18\frac{1}{4}$	41	5.05	7.10
24	54	6.50	8.75

Nos. 35, 45, 55
***Bore $1\frac{15}{16}$ Inches, Also Nos. 47, 055, 55. Keeper 057 and L-111**

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
$2\frac{1}{4}$	4	2.00	....
$2\frac{3}{4}$	5	2.00	....
$3\frac{1}{4}$	6	2.05	....
$3\frac{3}{4}$	7	2.10	....
$4\frac{1}{4}$	8	2.15	3.70
$4\frac{3}{4}$	9	2.20	3.75
$5\frac{1}{4}$	10	2.25	3.80
$5\frac{3}{4}$	11	2.35	4.00
$6\frac{1}{4}$	12	2.40	4.05
$6\frac{3}{4}$	13	2.50	4.15
$7\frac{1}{4}$	14	2.65	4.30
$7\frac{3}{4}$	15	2.75	4.40
$8\frac{1}{4}$	16	2.85	4.60
$8\frac{3}{4}$	17	3.00	4.75
$9\frac{1}{4}$	18	3.15	4.90
$9\frac{3}{4}$	19	3.30	5.05
$10\frac{1}{4}$	20	3.40	5.15
11	21	3.60	5.55
$11\frac{1}{2}$	22	3.80	5.75
12	23	3.95	5.90
$12\frac{1}{4}$	24	4.15	6.10
14	27	4.65	6.75
$15\frac{1}{2}$	30	5.20	7.30
16	31	5.35	7.55
18	55	6.05	8.25

*An extra charge is made for wheels having special hubs, or wheels bored larger than specified above on account of additional weight.

SPROCKET WHEELS—CONTINUED

Nos. 35, 45, 55—Cont.

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
18½	36	6.25	8.65
19¾	38	6.65	9.05
20¼	39	6.80	9.20
20¾	40	6.95	9.35
21¾	42	7.30	9.90
23¼	45	7.85	10.45
25¾	50	8.75	11.60
28	54	9.50	12.65
28½	55	9.75	12.90
30	58	10.35	13.75
35¾	69	12.85	16.80

No. 42

Also No. 042, *Bore 1 11/16 inches

2	5	1.85	....
2¾	6	1.85	....
3¼	7	1.90	....
4	9	2.00	3.45
4½	10	2.05	3.50
4¾	11	2.10	3.60
5¼	12	2.15	3.65
5¾	13	2.25	3.75
6	14	2.30	3.80
7½	17	2.55	4.10
8	18	2.70	4.25
8¼	19	2.80	4.35
9½	22	3.10	4.75
10½	24	3.35	5.00
11¾	27	3.70	5.40
14	32	4.25	6.10
15¾	36	4.80	6.75
17¾	41	5.45	7.50
20	46	6.15	8.30
24	55	7.40	9.65

No. 51 *Bore 1 15/16 inches

1¾	5	1.75	....
2½	7	1.75	....
3	8	1.80	3.15
3¼	9	1.85	3.20
3½	10	1.90	3.25
4	11	1.95	3.35
5	14	2.10	3.50
5½	15	2.15	3.55
6¼	17	2.25	3.70
8	22	2.65	4.20
9¼	25	2.90	4.45
10	27	3.10	4.70
12¼	33	3.60	5.25
14	39	4.20	5.90
15½	42	4.55	6.40

No. 52

*Bore 1 15/16 inches, Also Nos. 052, 52½ Heavy and 063

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
3¼	7	1.95	....
3¾	8	2.00	3.55
4¼	9	2.10	3.65
4¾	10	2.15	3.70
5¼	11	2.25	3.90
5¾	12	2.30	3.95
6¼	13	2.40	4.05
6¾	14	2.50	4.15
7¼	15	2.60	4.25
7¾	16	2.70	4.45
8¼	17	2.80	4.55
8¾	18	2.90	4.65
9	19	3.05	4.80
9½	20	3.15	4.90
10	21	3.30	5.20
10½	22	3.40	5.30
11	23	3.55	5.45
12	25	3.85	5.75
12½	26	4.00	6.00
13½	28	4.30	6.30
14¼	30	4.60	6.60
16¼	34	5.30	7.40
18¼	38	5.95	8.15
19¼	40	6.30	8.50
20¼	42	6.60	8.95
22	46	7.30	9.80
23½	49	7.80	10.30
24	50	8.00	10.50
26½	55	8.80	11.50
30½	64	10.35	13.45
36	75	12.20	15.75

Nos. 57, 67, 77,

*Bore 2 7/16 inches, Also Riveted Nos. 60 and 73, Also Steel Bushed Roller No. 67

4	5	2.30	....
4¾	6	2.30	....
C 5¼	7	2.40	....
6	8	2.55	4.25
6¾	9	2.70	4.40
7½	10	2.90	4.60
8¼	11	3.10	5.00
C 9	12	3.30	5.20
C 9½	13	3.50	5.40
10¼	14	3.75	5.65
11	15	4.00	5.90
C11¾	16	4.25	6.40
12½	17	4.50	6.65
13¼	18	4.75	6.90

Nos. 57, 67, 77 Cont.

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
14	19	5.00	7.15
14¾	20	5.25	7.40
15½	21	5.50	7.95
C16¼	22	5.75	8.20
17	23	6.00	8.45
17¾	24	6.25	8.70
18¼	25	6.50	8.95
19	26	6.75	9.45
C19¾	27	7.10	9.80
20½	28	7.35	10.05
22	30	7.90	10.60
23½	32	8.50	11.55
24¼	33	8.80	11.85
25	34	9.10	12.15
25¾	35	9.40	12.45
C26½	36	9.70	13.15
C28	38	10.30	13.75
30	41	11.20	15.05
32½	44	12.10	15.95
36	49	13.75	18.05
38¼	52	14.80	19.55
39¾	54	15.50	20.25
41¼	56	16.20	21.45
44	60	17.60	22.85

No. 62

*Bore 2 7/16 inches, Also Nos. 062, 62½, 71, 072 and 72½, Also Riveted Nos. 62 and T-62

3¾	7	2.15	....
C 4¼	8	2.20	3.85
4¾	9	2.25	3.90
5¼	10	2.35	4.00
5¾	11	2.45	4.20
6¼	12	2.55	4.30
7½	14	2.75	4.50
8	15	2.90	4.65
8½	16	3.05	5.00
C 9½	18	3.35	5.30
10½	20	3.65	5.60
11½	22	3.95	6.05
12¼	23	4.10	6.20
13¾	26	4.55	6.90
C14¾	28	4.90	7.25
15¾	30	5.30	7.65
16¾	32	5.70	8.20
18	34	6.10	8.60
20	38	6.90	9.60
22¾	43	7.90	10.85
23¾	45	8.35	11.30
25¾	49	9.25	12.50
30½	58	11.80	15.70

*An extra charge is made for wheels having special hubs, or wheels bored larger than specified above, on account of additional weight.

SPROCKET WHEELS—CONTINUED

No. 66 *Bore 2 7/16 inches

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
5	8	2.30	3.90
5¾	9	2.40	4.00
7	11	2.70	4.40
7½	12	2.85	4.55
8½	13	3.00	4.70
10¼	16	3.60	5.45
12	19	4.20	6.05
16¼	25	5.60	7.60

Nos. 75, 78, 88

*Bore 2 15/16 inches, Also No. 88½ Riveted Nos. 74, 75, 78 and T-88, Combination No. 188, Steel Bushed Roller No. 88

4¼	5	2.75	....
C 5	6	2.90	....
6	7	3.10	....
6¾	8	3.30	5.20
7½	9	3.50	5.40
C 8¼	10	3.75	5.65
C 9¼	11	4.00	6.20
C10	12	4.30	6.50
C10¾	13	4.60	6.80
C11¾	14	4.90	7.10
C12½	15	5.20	7.40
C13¼	16	5.55	8.25
C14¼	17	5.90	8.60
C15	18	6.25	8.95
C15¾	19	6.60	9.30
C16¾	20	6.95	9.65
C17½	21	7.30	10.50
C18¼	22	7.65	10.85
C20	24	8.35	11.55
20¾	25	8.70	11.90
C22½	27	9.40	13.15
C23¼	28	9.75	13.50
C24¼	29	10.10	13.85
C25	30	10.45	14.20
25¾	31	10.80	15.10
C26¾	32	11.15	15.45
C28¼	34	11.95	16.25
29¼	35	12.35	16.65
C30	36	12.75	17.60
30¾	37	13.20	18.05
C32½	39	14.10	18.95
C33¼	40	14.60	19.45
C35¾	43	16.20	21.65
C36½	44	16.75	22.20
C38¼	46	17.85	23.90
40¾	49	19.50	25.55
41½	50	20.00	26.05
C48¼	58	24.80	32.10

Nos. 83, 93

*Bore 2 15/16 inches, All Double Teeth

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
12	18	5.70	7.95
15¼	24	7.20	10.20
16½	26	7.60	10.60
17¾	28	8.20	11.20
20½	32	9.30	13.15
24¼	38	11.10	14.95
28	44	13.30	18.05
30¾	48	14.90	19.65
34½	54	17.50	23.15
41	64	23.10	29.60
51	80	31.70	39.20

Nos. 85, 94, 95

*Bore 2 15/16 inches, Also Riveted Nos. 85 and 95, Also Combination Nos. 102 and 102½

7¾	6	4.70	7.30
C10½	8	5.70	8.30
12¾	10	6.80	9.40
C14	11	7.30	10.65
15½	12	7.80	11.15
16½	13	8.40	11.75
C18	14	9.00	12.35
C19	15	9.70	13.05
C20½	16	10.40	14.70
C24¼	19	12.40	16.70
C25½	20	13.00	17.30
26¾	21	13.75	19.05
C30½	24	16.50	21.80
35¾	28	20.90	27.20

No. 103

*Bore 3 7/16 inches, Also Riveted Nos. 82 and T-103, Combination No. 131, Steel Bushed Roller No. 103

6	6	3.60	6.05
7	7	4.00	6.45
C 8	8	4.40	6.85
C 9	9	4.80	7.25
C 9¾	10	5.25	7.70
C10¾	11	5.65	8.65
C11¾	12	6.05	9.05
C12¾	13	6.45	9.45
C13¾	14	6.85	9.85
C14¾	15	7.25	10.25
C15¾	16	7.65	11.30
C16¾	17	8.05	11.70
C17½	18	8.45	12.10

No. 103—CONTINUED

Pitch Diam. Inches	No. of Teeth	Price, Each Solid	Price, Each Split
C18½	19	8.90	12.55
C19½	20	9.40	13.05
20½	21	9.90	14.30
C21½	22	10.35	14.75
22½	23	10.80	15.20
C23½	24	11.20	15.60
24½	25	11.70	16.10
C25½	26	12.25	17.45
26½	27	12.75	17.95
C27½	28	13.30	18.50
28¼	29	13.85	19.05
C29¼	30	14.40	19.60
C30¼	31	15.20	21.15
C31¼	32	16.00	21.95
C32¼	33	16.80	22.75
33¼	34	17.60	23.55
C34¼	35	18.40	24.35
C35¼	36	19.25	26.00
C37¼	38	21.20	27.95
39¼	40	23.10	29.85
41	42	24.80	32.25
44	45	27.35	34.80
45	46	28.20	36.40
48	49	30.75	38.95
52¾	54	34.90	43.85
56¾	58	38.30	47.95
C59½	61	41.00	51.35
61½	63	42.80	53.15
65½	67	46.50	57.60
79	81	70.00	83.20

No. 105 *Bore 3 7/16 inches

11¾	6	6.20	9.50
15¾	8	8.00	11.85
19½	10	10.00	13.85
21	11	10.50	15.35
23¼	12	11.00	15.85
25¼	13	12.20	17.05
27¼	14	14.40	19.25
30	15	15.00	19.85
48½	25	30.00	38.25

Nos. 108, 110

*Bore 3 7/16 inches, Also Riveted No. 108, Combination No. 111

12¼	8	6.80	10.10
13¾	9	7.50	10.80
C16¾	11	9.10	13.35
C18¼	12	9.90	14.15
C19¾	13	10.90	15.15

*An extra charge is made for wheels having special hubs, or wheels bored larger than specified above on account of additional weight.

MALLEABLE IRON MS BUCKETS

STYLE A

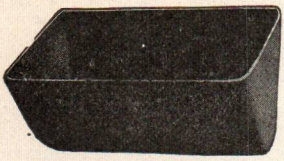
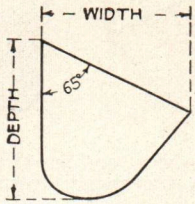
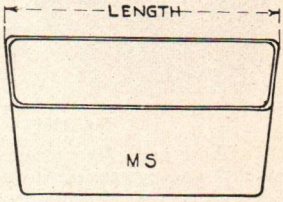


Fig. 24471A





These malleable iron manufacturers' standard buckets are seamless, strong and smooth, and are designed to insure proper filling in the boot, and free and clean delivery at the head.

They have re-enforced corners, which make them stronger than steel buckets of equal gauge, and the material of which they are made resists wear much better than the soft grade of steel which has to be used in the manufacture of steel buckets.

They are uniformly made with the faces of the ends at an angle of 6 degrees from the vertical, matching standard G attachments.

Buckets are furnished punched or plain. In ordering, state whether buckets are to be punched for flat belt or Link-Belt, and if for the latter, give size and number of strands of Link-Belt and style of attachment.

The Style A bucket is the standard form and the most generally used.

Length Inches	Width Inches	Depth Inches	Contents Cubic Inches	Contents Cubic Feet	Price Each
4	2¾	3	16	.009	**.31**
5	3½	3¾	36	.020	**.43**
6	4	4¼	55	.032	**.55**
7	4½	5	85	.049	**.76**
8	5	5½	115	.067	**.90**
10	6	6¼	204	.118	**1.45**
11	6	6¼	223	.129	**1.55**
12	6	6¼	246	.142	**1.65**
12	7	7¼	332	.192	**1.90**
14	7	7¼	391	.226	**2.20**
15	7	7¼	425	.246	**2.35**
16	7	7¼	467	.270	**2.60**
14	8	8½	509	.295	**3.00**
16	8	8½	593	.343	**3.40**
18	8	8½	668	.387	**3.75**
24	8	8½	887	.513	**5.40**
18	10	10½	1053	.609	**5.85**

MALLEABLE IRON ELEVATOR BUCKETS

STYLE A

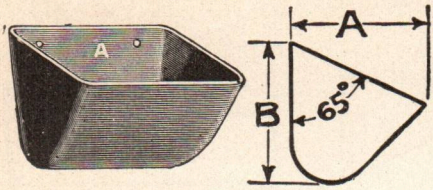


Fig. 23580A

STYLE AA

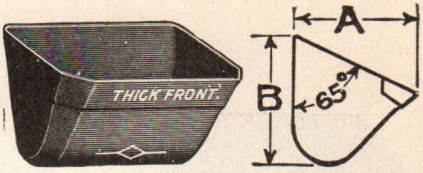


Fig. 23580B

These buckets are cast in one piece and are carefully annealed. They are perfectly smooth and possess all the advantage of rounded corners, and bottoms.

Style A is the most generally used. It is adapted to handling ear corn, coal, phosphates, chemicals, pulp, etc.

Style AA is similar in form to the A Bucket, but has thickened edges and corners, increasing its durability.

STYLE B

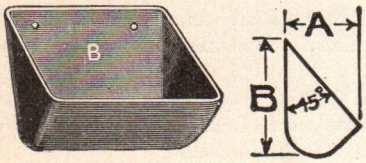


Fig. 23580C

STYLE C

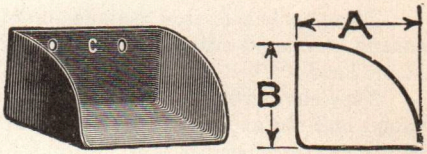


Fig. 23580D

Style B is for inclined elevators, to handle stone, ore, cement, clinkers, etc.

Style C is for handling sugar, clay and other sticky materials.

STYLE D

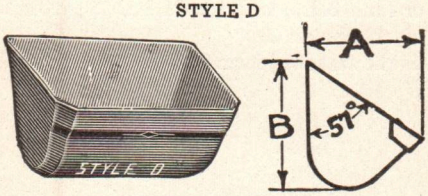


Fig. 23580E

Style D is preferred by some for service similar to that of Style A.

Manufacturers Standard sizes are recognized as regular and should be used wherever possible, rather than odd sizes.

No charge is made for punching. If to be used on chain belt, state number of chain and style of attachments to be used.

REGULAR SIZES

STYLE A

Size of Bucket, Inches — Length	Projection A	Depth B	Capacity Cubic Inches	Price Each	Size of Bucket, Inches — Length	Projection A	Depth B	Capacity Cubic Inches	Price Each
4	2¾	3	16	**.31**	12	7	7¼	332	**1.90**
5	3½	3¾	36	**.43**	14	7	7¼	391	**2.20**
6	4	4¼	55	**.55**	14	8	8½	509	**3.00**
7	4½	5	85	**.76**	15	7	7¼	425	**2.53**
8	5	5½	115	**.90**	16	7	7¼	467	**2.60**
10	6	6¼	204	**1.45**	16	8	8½	593	**3.40**
11	6	6¼	223	**1.55**	18	8	8½	668	**3.75**
12	6	6¼	246	**1.65**	18	10	10½	1053	**5.85**

SALEM STEEL ELEVATOR BUCKETS

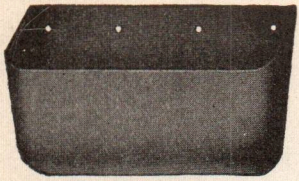


Fig. 6212A

SHOWING GAUGES

Fig. 6212B

CLASS A

Size, Inches		Gauge No.	Price Each
Width	Proj.		
2	2	25	.10
2½	2¼	24	.10
3	2¼	24	.10
3½	2¼	24	.10
4	2¼	24	.15
5	2¼	24	.15
2½	2½	24	.10
3	2½	24	.10
3½	2½	24	.10
4	2½	24	.15
3	3	23	.10
3½	3	23	.10
4	3	23	.15
4½	3	23	.15
5	3	23	.18
6	3	23	.20
7	3	23	.22
3½	3½	22	.15
4	3½	22	.15
4½	3½	22	.15
5	3½	22	.19
6	3½	22	.21
7	3½	22	.25
5	4	22	.19
5½	4	21	.22
6	4	21	.22
6	4½	20	.28
6½	4½	20	.30
7	4½	20	.30
8	5	19	.38
9	5	19	.40
9	5½	19	.48
10	5½	19	.48
10	6	18	.55
11	6	18	.63
12	6	18	.70
14	6	18	.80
16	6	18	.90
18	6	18	1.00
20	6	18	1.10
10	7	18	.75
11	7	18	.85
12	7	18	.90
14	7	18	.95

CLASS B

Size, Inches		Gauge No.	Price Each	Size, Inches		Gauge No.	Price Each
Width	Proj.			Width	Proj.		
3	1½	25	.10	5½	5	19	.41
2½	2	25	.10	6	5	19	.43
3	2	25	.15	6½	5	19	.44
3½	2	25	.15	7	5	19	.45
4½	2¼	24	.15	7½	5	19	.46
17	2¼	24	.43	8½	5	19	.48
4½	2½	24	.16	9½	5	19	.50
5	2½	24	.16	10	5	19	.55
5½	3	23	.18	11	5	19	.60
6½	3	23	.24	12	5	19	.65
7½	3	23	.25	14	5	19	.70
8	3	23	.25	16	5	19	.75
8½	3	23	.28	5½	5½	19	.45
9	3	23	.30	6	5½	19	.46
5½	3½	22	.21	6½	5½	19	.48
6½	3½	22	.23	7	5½	19	.49
7½	3½	22	.25	7½	5½	19	.50
8	3½	22	.28	8	5½	19	.53
8½	3½	22	.30	8½	5½	19	.55
9	3½	22	.33	9½	5½	19	.61
4	4	22	.22	11	5½	19	.65
4½	4	22	.23	12	5½	19	.70
6½	4	21	.27	6	6	18	.60
7	4	21	.30	7	6	18	.63
7½	4	21	.33	8	6	18	.65
8	4	21	.35	9	6	18	.68
8½	4	21	.38	13	6	18	.85
9	4	21	.40	15	6	18	.95
9½	4	21	.45	17	6	18	1.05
10	4	21	.46	19	6	18	1.15
11	4	21	.48	21	6	18	1.20
12	4	21	.50	22	6	18	1.25
4½	4½	20	.27	23	6	18	1.30
5	4½	20	.30	24	6	18	1.35
5½	4½	20	.35	6½	6½	18	.65
7½	4½	20	.36	7	6½	18	.70
8	4½	20	.38	8	6½	18	.75
8½	4½	20	.40	9	6½	18	.80
9	4½	20	.45	10	6½	18	.85
9½	4½	20	.50	11	6½	18	.90
10	4½	20	.51	12	6½	18	.95
11	4½	20	.53	13	6½	18	1.00
12	4½	20	.55	14	6½	18	1.05
5	5	19	.40	15	6½	18	1.10

PACKING AND SCRAPING TOOLS

ENGINEERS' SPECIAL CHISELS

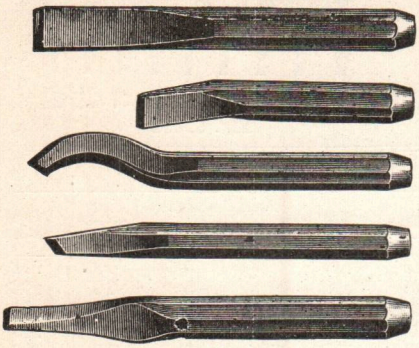


Fig. 1194A

PACKING TOOLS

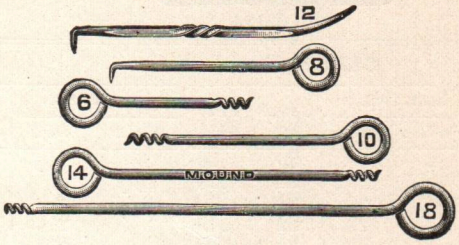


Fig. 1194B

ENGINEERS' SPECIAL CHISELS

Price, Set of Five, Consisting of a Flat, Narrow Cape, Bent Grooving and Diamond Point Chisel, also a Calking Tool; Length, about 8 inches, made of ¾ and ⅝-inch Steel ..... per set **2.00**

PACKING TOOLS

Price, Set of Four Packing Tools ..... per set **1.50**
" " " Six " " ..... " **2.25**
Sizes 6, 8, 10, 12, 14 and 18 inches long.

SCRAPING TOOLS

For Scraping Valves, Journals, Bearings, Etc.

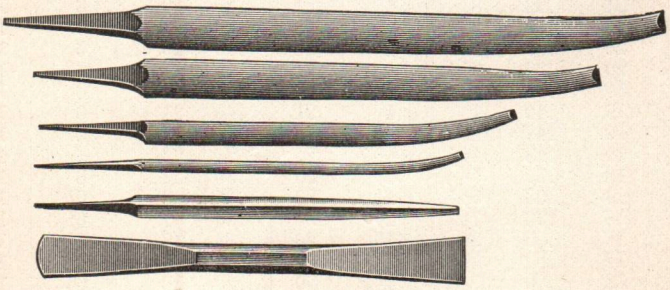
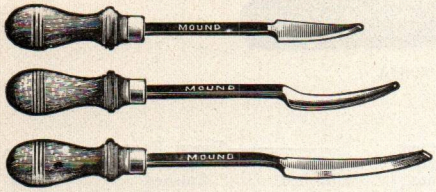


Fig. 1194C

No. 1, Set of Six Scrapers, Tempered and Polished, Packed in a Neat Oak Case..per set **3.00**
" **2,** " " " " Special and Hollow Ground, " " " " " " " **4.00**

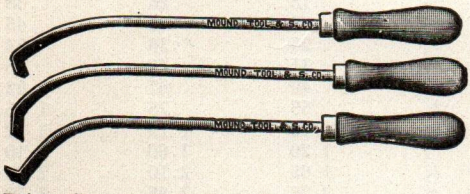
BEARING SCRAPERS

No. 7 CURVED BEARING SCRAPERS



Price, Set of 3 Scrapers.....per set **1.00**

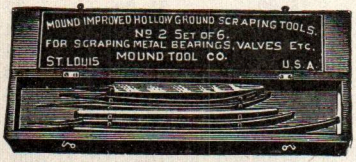
No. 25 CYLINDER CARBON SCRAPERS



Price, Set of 3 Carbon Scrapers, Polished Nickel.....per set **1.00**
Price, Set of 3 Carbon Scrapers, plain Nickel.....per set **.75**

MOUND HOLLOW GROUND SCRAPING TOOLS

SET No. 22



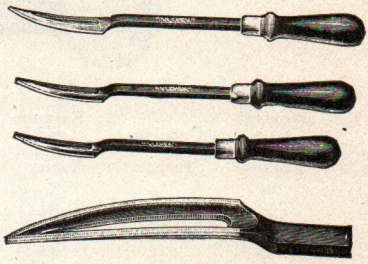
There are 6 scraping tools in this set with assorted sizes ranging from 6 to 10 inches in length.

These scrapers are made of the best tool steel, carefully forged, tempered and hollow ground. Set contains shapes and sizes best suited for scraping bearings and oil grooves.

Comes in oak case with metal forms for holding each tool in its place.

Price, Set of 6 Mound Hollow Ground Scraping Tools...per set **3.00**

NON-CHATTERING BEARING SCRAPERS



Hand forged from high-grade tool steel, ground with perfect edges and positively non-chattering. Each blade is protected by a leather pocket.

The blades have just the right curve for scraping bearings and grooves on automobiles.

These scrapers are forged from steel tempered for effective work. Hollow ground and polished finish. Mounted on ebony handles, and packed in a box.

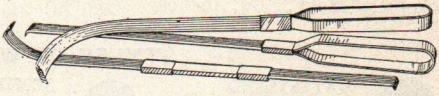
Price.....per set **2.50**

No. 193 3-SQUARE SCRAPERS

This tool is forged from English file steel, and is ground and tempered. A convenient tool for garage men, plumbers and mechanics. Handy for scraping small surfaces.

Length, Over All.....inches 7
" of Blade..... " 3¼
Price.....each **.50**

WIRE CARBON SCRAPERS



Flexible carbon scrapers make scraping cylinders easy, as they are specially designed for reaching all parts of the combustion chamber and piston head. Made of spring wire.

The No. 1 set is for small motors, and No. 2 for larger motors.

Price.....per set **1.50**

ENGINEERS' SINGLE-HEAD WRENCHES

15° ANGLE

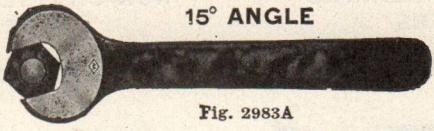


Fig. 2983A

No.	For U. S. Standard Nuts Size Bolts Inches	Openings Finished Inches	Extreme Length Approx. Inches	Thickness Head Inches	Price, Each Un-finished	Price, Each Semi-finished	Price, Each Fin-ished
00	1/8	5/16	3	5/32	.09	.14	.22
0	3/16	13/32	3 1/2	3/16	.10	.15	.25
1	1/4	1/2	4	1/4	.12	.18	.28
2	5/16	19/32	4 3/4	9/32	.15	.22	.32
3	3/8	11/16	5 5/8	5/16	.18	.26	.38
4	7/16	25/32	6 1/2	11/32	.22	.32	.45
5	1/2	7/8	7 1/2	13/32	.26	.38	.54
6	9/16	31/32	8 3/8	7/16	.31	.46	.65
7	5/8	1 1/16	9 1/4	1/2	.40	.57	.82
8	3/4	1 1/4	11 1/8	9/16	.55	.75	1.05
9	7/8	1 7/16	13	21/32	.85	1.15	1.52
10	1	1 5/8	14 3/4	3/4	1.20	1.60	2.10
11	1 1/8	1 13/16	16 1/2	27/32	1.65	2.10	2.80
12	1 1/4	2	18 1/2	29/32	2.20	2.85	3.70
13	1 3/8	2 3/16	20	1	2.80	3.65	4.70
14	1 1/2	2 3/8	22	1 1/16	3.45	4.60	5.80
15	1 5/8	2 9/16	24	1 1/8	4.15	5.60	7.10
16	1 3/4	2 3/4	25 1/2	1 7/32	4.90	6.70	8.50
16A	1 7/8	2 15/16	27	1 7/32	4.90	6.70	8.50
17	2	3 1/8	29 1/2	1 3/8	7.50	10.25	13.00
18	2 1/4	3 1/2	33	1 17/32	11.50	14.75	18.00
19	2 1/2	3 7/8	37	1 5/8	17.00	21.00	25.00
19A	2 3/4	4 1/4	39	1 5/8	17.00	21.00	25.00
20	3	4 5/8	41	1 7/8	25.00	31.00	37.00
20A	3 1/4	5	43	1 7/8	25.00	31.00	37.00
21A	3 1/2	5 3/8	45	2 1/2	40.00	52.00	64.00
21B	3 3/4	5 3/4	47	2 1/2	40.00	52.00	64.00
21C	4	6 1/8	49	2 1/2	40.00	52.00	64.00
22A	4 1/2	6 7/8	51	3	80.00	102.00	124.00
22B	5	7 5/8	53	3	80.00	102.00	124.00

Wrenches of this style with taper handles will be furnished on sizes No. 11 and up. The following semifinished and finished wrenches have hole drilled in end of handle:

Number	17	18	19	19A	20	20A	21A	21B	21C	22A	22B
Diam. of Hole .....inches	5/8	3/4	7/8	7/8	1	1	1 1/8	1 1/8	1 1/8	1 1/4	1 1/4

STYLES OF WRENCHES

UNFINISHED

Fig. 2983B

SEMIFINISHED

Fig. 2983C

FINISHED

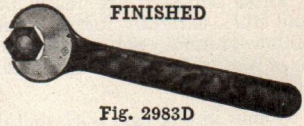


Fig. 2983D

Unfinished wrenches are milled only. Semifinished are milled, casehardened, black lacquered; heads ground bright. Finished are milled, polished all over, color casehardened and lacquered; heads bright.

ENGINEERS' DOUBLE-HEAD WRENCHES

15° ANGLE

Fig. 2984A

Number	For U.S. Standard Nuts, Size Bolts, Inches	Openings Milled Inches	Extreme Length Approx., In.	Thickness Heads Inches	Price, Each Unfinished	Semifinished	Finished
21	1/8 and 3/16	5/16 and 13/32	3 1/2	3/16	.12	.17	.26
22	1/8 " 1/4	5/16 " 1/2	4	1/4	.14	.21	.32
23	3/16 " 1/4	13/32 " 1/2	4	1/4	.14	.21	.32
24	3/16 " 5/16	13/32 " 19/32	4 7/8	9/32	.17	.25	.38
25	1/4 " 5/16	1/2 " 19/32	4 7/8	9/32	.17	.25	.38
26	1/4 " 3/8	1/2 " 11/16	5 7/8	5/16	.21	.31	.46
27	5/16 " 3/8	19/32 " 11/16	5 7/8	5/16	.21	.31	.46
28	5/16 " 7/16	19/32 " 25/32	6 7/8	11/32	.25	.37	.56
29	3/8 " 7/16	11/16 " 25/32	6 7/8	11/32	.25	.37	.56
30	3/8 " 1/2	11/16 " 7/8	7 3/4	13/32	.30	.45	.68
31	7/16 " 1/2	25/32 " 7/8	7 3/4	13/32	.30	.45	.68
32	7/16 " 9/16	25/32 " 31/32	8 3/4	7/16	.37	.55	.85
33	1/2 " 9/16	7/8 " 31/32	8 3/4	7/16	.37	.55	.85
34	1/2 " 5/8	7/8 " 1 1/16	9 3/4	1/2	.46	.68	1.08
35	9/16 " 5/8	31/32 " 1 1/16	9 3/4	1/2	.46	.68	1.08
36	9/16 " 3/4	31/32 " 1 1/4	11 1/2	9/16	.66	.96	1.40
37	5/8 " 3/4	1 1/16 " 1 1/4	11 1/2	9/16	.66	.96	1.40
38	5/8 " 7/8	1 1/16 " 1 7/16	13 1/2	21/32	1.00	1.40	1.90
39	3/4 " 7/8	1 1/4 " 1 7/16	13 1/2	21/32	1.00	1.40	1.90
40	3/4 " 1	1 1/4 " 1 5/8	15 1/2	3/4	1.40	1.90	2.60
41	7/8 " 1	1 7/16 " 1 5/8	15 1/2	3/4	1.40	1.90	2.60
42	7/8 " 1 1/8	1 7/16 " 1 13/16	17	27/32	1 90	2.65	3.50
43	1 " 1 1/8	1 5/8 " 1 13/16	17	27/32	1.90	2.65	3.50
44	1 " 1 1/4	1 5/8 " 2	19	29/32	2.60	3.60	4.70
45	1 1/8 " 1 1/4	1 13/16 " 2	19	29/32	2.60	3.60	4.70
46	1 1/8 " 1 3/8	1 13/16 " 2 3/16	21	1	3.80	5.25	6.70
47	1 1/4 " 1 3/8	2 " 2 3/16	21	1	3.80	5.25	6.70
48	1 1/4 " 1 1/2	2 " 2 3/8	23	1 1/16	5.20	7.00	8.80
49	1 3/8 " 1 1/2	2 3/16 " 2 3/8	23	1 1/16	5.20	7.00	8.80
50	1 3/8 " 1 5/8	2 3/16 " 2 9/16	25	1 and 1 1/8	6.75	9.00	11.25
51	1 1/2 " 1 5/8	2 3/8 " 2 9/16	25	1 1/16 " 1 1/8	7.40	9.90	12.40
52	1 1/2 " 1 3/4	2 3/8 " 2 3/4	27	1 1/16 " 1 7/32	8.35	11.00	13.65
53	1 5/8 " 1 3/4	2 9/16 " 2 3/4	27	1 1/8 " 1 7/32	9.00	12.00	15.00
54	1 5/8 " 2	2 9/16 " 3 1/8	31	1 1/8 " 1 3/8	11.00	14.25	17.50
55	1 3/4 " 2	2 3/4 " 3 1/8	32	1 7/32 " 1 3/8	12.00	15.50	19.00
56	1 3/4 " 2 1/4	2 3/4 " 3 1/2	34	1 7/32 " 1 17/32	16.00	20.00	24.00
57	2 " 2 1/4	3 1/8 " 3 1/2	36	1 3/8 " 1 17/32	18.50	23.50	28.50
57A	2 " 2 1/2	3 1/8 " 3 7/8	37	1 3/8 " 1 5/8	23.00	28.00	33.00
58	2 1/4 " 2 1/2	3 1/2 " 3 7/8	38	1 17/32 " 1 5/8	26.00	31.00	36.00
59	2 1/4 " 2 3/4	3 1/2 " 4 1/4	39	1 17/32 " 1 5/8	26.00	31.00	36.00
60	2 1/2 " 2 3/4	3 7/8 " 4 1/4	40	1 5/8 " 1 5/8	30.00	37.50	45.00
61	2 1/2 " 3	3 7/8 " 4 5/8	42	1 5/8 " 1 7/8	38.00	47.00	56.00
62	2 3/4 " 3	4 1/4 " 4 5/8	44	1 5/8 " 1 7/8	38.00	47.00	56.00
63	2 3/4 " 3 1/2	4 1/4 " 5 3/8	46	1 5/8 " 2 1/2	55.00	67.50	80.00
64	3 " 3 1/2	4 5/8 " 5 3/8	48	1 7/8 " 2 1/2	55.00	77.50	90.00

Made regularly with openings for U. S. standard finished nuts, Whitworth standard and metric measure.

FLAT HANDLE "S" WRENCHES

22½° ANGLE, DOUBLE-HEAD

Fig. 6343A

Number	U. S. Nuts Size Bolts Inches	Hex. Head Cap Screws Diam. Inches	Openings Milled Inches	Length Over All Inches	Thickness Heads Inches	Price, Each Unfinished	Price, Each Semi-finished	Price, Each Finished
661 A	1/8 and 3/16	.....	5/16 and 13/32	4	9/32	.15	.22	.32
B	1/8 " 1/4	.....	5/16 " 1/2	4	9/32	.15	.22	.32
C	3/16 " 1/4	.....	13/32 " 1/2	4	9/32	.15	.22	.32
D	.....	1/8 and 3/16	5/16 " 3/8	4	9/32	.15	.22	.32
E	.....	1/8 " 1/4	5/16 " 7/16	4	9/32	.15	.22	.32
F	.....	3/16 " 1/4	3/8 " 7/16	4	9/32	.15	.22	.32
G	.....	3/16 " 5/16	3/8 " 1/2	4	9/32	.15	.22	.32
662 A	3/16 and 5/16	.....	13/32 " 19/32	5	5/16	.20	.29	.42
B	1/4 " 5/16	.....	1/2 " 19/32	5	5/16	.20	.29	.42
C	1/4 " 3/8	.....	1/2 " 11/16	5	5/16	.20	.29	.42
D	.....	1/4 and 5/16	7/16 " 1/2	5	5/16	.20	.29	.42
E	.....	1/4 " 3/8	7/16 " 9/16	5	5/16	.20	.29	.42
F	.....	5/16 " 3/8	1/2 " 9/16	5	5/16	.20	.29	.42
G	.....	5/16 " 7/16	1/2 " 5/8	5	5/16	.20	.29	.42
663 A	5/16 and 3/8	.....	19/32 " 11/16	6¼	3/8	.27	.39	.56
B	5/16 " 7/16	.....	19/32 " 25/32	6¼	3/8	.27	.39	.56
C	3/8 " 7/16	.....	11/16 " 25/32	6¼	3/8	.27	.39	.56
D	.....	3/8 and 7/16	9/16 " 5/8	6¼	3/8	.27	.39	.56
E	.....	3/8 " 1/2	9/16 " 3/4	6¼	3/8	.27	.39	.56
F	.....	7/16 " 1/2	5/8 " 3/4	6¼	3/8	.27	.39	.56
G	.....	7/16 " 9/16	5/8 " 13/16	6¼	3/8	.27	.39	.56
664 A	3/8 and 1/2	.....	11/16 " 7/8	7½	7/16	.37	.53	.75
B	7/16 " 1/2	.....	25/32 " 7/8	7½	7/16	.37	.53	.75
C	7/16 " 9/16	.....	25/32 " 31/32	7½	7/16	.37	.53	.75
D	.....	1/2 and 9/16	3/4 " 13/16	7½	7/16	.37	.53	.75
E	.....	1/2 " 5/8	3/4 " 7/8	7½	7/16	.37	.53	.75
F	.....	9/16 " 5/8	13/16 " 7/8	7½	7/16	.37	.53	.75
665 A	1/2 and 9/16	.....	7/8 " 31/32	9	1/2	.50	.72	1.00
B	1/2 " 5/8	.....	7/8 " 1 1/16	9	1/2	.50	.72	1.00
C	9/16 " 5/8	.....	31/32 " 1 1/16	9	1/2	.50	.72	1.00
D	.....	9/16 and 3/4	13/16 " 1	9	1/2	.50	.72	1.00
E	.....	5/8 " 3/4	7/8 " 1	9	1/2	.50	.72	1.00
F	.....	5/8 " 7/8	7/8 " 1 1/8	9	1/2	.50	.72	1.00
G	.....	3/4 " 7/8	1 " 1 1/8	9	1/2	.50	.72	1.00
666 A	9/16 and 3/4	.....	31/32 " 1 1/4	10½	9/16	.74	1.00	1.35
B	5/8 " 3/4	.....	1 1/16 " 1 1/4	10½	9/16	.74	1.00	1.35
C	5/8 " 7/8	.....	1 1/16 " 1 7/16	10½	9/16	.74	1.00	1.35
D	.....	3/4 and 1	1 " 1 1/4	10½	9/16	.74	1.00	1.35
E	.....	7/8 " 1	1 1/8 " 1 1/4	10½	9/16	.74	1.00	1.35
F	.....	7/8 " 1 1/8	1 1/8 " 1 3/8	10½	9/16	.74	1.00	1.35
667 A	3/4 and 7/8	.....	1 1/4 " 1 7/16	12	5/8	1.10	1.45	1.90
B	3/4 " 1	.....	1 1/4 " 1 5/8	12	5/8	1.10	1.45	1.90
C	7/8 " 1	.....	1 7/16 " 1 5/8	12	5/8	1.10	1.45	1.90
D	.....	1 and 1 1/8	1 1/4 " 1 3/8	12	5/8	1.10	1.45	1.90
E	.....	1 " 1 1/4	1 1/4 " 1 1/2	12	5/8	1.10	1.45	1.90
F	.....	1 1/8 " 1 1/4	1 3/8 " 1 1/2	12	5/8	1.10	1.45	1.90
668 A	7/8 and 1 1/8	.....	1 7/16 " 1 13/16	14	3/4	1.90	2.50	3.20
B	1 " 1 1/8	.....	1 5/8 " 1 13/16	14	3/4	1.90	2.50	3.20
C	1 " 1 1/4	.....	1 5/8 " 2	14	3/4	1.90	2.50	3.20

WRENCHES

CONSTRUCTION—15° ANGLE

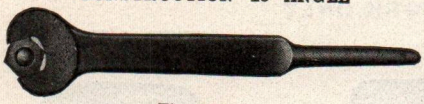


Fig. 9213A

STRUCTURAL STRAIGHT OPENING

Fig. 9213B

CONSTRUCTION

No.	U. S. S. Nuts Size of Bolts Inches	Extreme Length Inches	Thickness of Head Inches	Price, Each Un-finished	Price, Each Semi-finished
201	1/4	8	3/8	.28	.35
202	5/16	8	3/8	.28	.35
203	3/8	9 1/2	7/16	.35	.45
204	7/16	9 1/2	7/16	.35	.45
205	1/2	11	1/2	.45	.58
206	9/16	11	1/2	.45	.58
207	5/8	13	9/16	.62	.80
208	3/4	15	5/8	.86	1.10
209	7/8	17	11/16	1.18	1.50
210	1	19	3/4	1.60	2.10
211	1 1/8	21	7/8	2.20	3.00
212	1 1/4	21	7/8	2.20	3.00

STRUCTURAL STRAIGHT OPENING

No.	U. S. S. Nuts Size of Bolts Inches	Handle Offset Inches	Price, Each Un-finished	Price, Each Semi-finished
901	1/4	13/16	.33	.40
902	5/16	13/16	.33	.40
903	3/8	7/8	.40	.52
904	7/16	7/8	.40	.52
905	1/2	1	.52	.70
906	9/16	1	.52	.70
907	5/8	1 1/8	.74	.98
908	3/4	1 1/4	1.02	1.34
909	7/8	1 5/16	1.40	1.80
910	1	1 3/8	1.90	2.50
....	....	....	....	....
....	....	....	....	....

The tang is for bringing bolt holes into line and for insertion into convenient openings when wrench is not in use, preventing loss and keeping tool in sight.

CAR—22½° ANGLE, DOUBLE-HEAD

LONG LEVERAGE

Fig. 9213C

Long leverage. Unfinished are broached or milled only. Semifinished are broached, case-hardened all over.

No.	U. S. S. Nuts Size of Bolts Inches	Openings Inches	Extreme Length Inches	Thickness of Heads Inches	Price, Each Un-finished	Price, Each Semi-finished
367	3/8 and 1/2	23/32 and 29/32	12	7/16 and 1/2	.55	.75
370	1/2 " 5/8	15/16 " 1 1/8	19	1/2 " 1/2	.95	1.25
371	1/2 " 3/4	15/16 " 1 5/16	19	1/2 " 1/2	1.15	1.55
373	5/8 " 3/4	1 1/8 " 1 5/16	20	1/2 " 1/2	1.15	1.55
374	5/8 " 7/8	1 1/8 " 1 1/2	21	1/2 " 9/16	1.35	1.85
376	3/4 " 7/8	1 5/16 " 1 1/2	21	1/2 " 9/16	1.35	1.85
377	3/4 " 1	1 5/16 " 1 11/16	22	1/2 " 9/16	1.65	2.25
379	7/8 " 1	1 1/2 " 1 11/16	22	9/16 " 9/16	1.65	2.25
380	7/8 " 1 1/8	1 1/2 " 1 7/8	23	9/16 " 5/8	1.95	2.65
382	1 " 1 1/8	1 11/16 " 1 7/8	23	9/16 " 5/8	1.95	2.65
383	1 " 1 1/4	1 11/16 " 2 1/16	24	9/16 " 5/8	2.25	3.15
385	1 1/8 " 1 1/4	1 7/8 " 2 1/16	24	5/8 " 5/8	2.25	3.15
387	1 1/8 " 1 1/2	1 7/8 " 2 7/16	25	5/8 " 3/4	3.40	4.50
389	1 1/4 " 1 1/2	2 1/16 " 2 7/16	25	5/8 " 3/4	3.40	4.50

WILLIAMS' SUPERIOR DROP-FORGED WRENCH SETS

FOR LIGHT WORK ONLY

CARRIAGE MAKERS

Fig. 6356A

S. A. E.

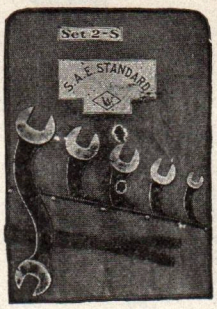


Fig. 6356B

GENERAL SERVICE

Fig. 6356C

CARRIAGE MAKERS' SET, No. 1 LIGHT

WITH OPENINGS FOR MANUFACTURERS' STANDARD NUTS

No.	For Mfrs. Standard Nuts Size of Bolts Inches	Openings Milled Inches	Extreme Length Inches	Thickness of Heads Inches	Price, Each Unfinished	Price, Each Semi-finished	Price, Each Finished
675	3/16 and 1/4	13/32 and 1/2	6 1/4	1/4	.18	.27	.38
677	1/4 " 5/16	1/2 " 5/8	7 1/4	9/32	.23	.34	.47
679	5/16 " 3/8	5/8 " 11/16	8 1/4	5/16	.29	.43	.58
681	3/8 " 7/16	11/16 " 27/32	9 1/4	3/8	.38	.55	.72
683	7/16 " 1/2	27/32 " 15/16	10 3/8	7/16	.50	.70	.90
Set No. 1—Price of Roll, 45 Cents Extra					1.58	2.29	3.05

S. A. E. STANDARD (AUTOMOBILE) SET No. 2-S

WITH OPENINGS FOR S. A. E. STANDARD NUTS AND CAP SCREWS

No.	For S. A. E. Standard Nuts and Cap Screws Size of Bolt or Screw, Inches	Openings Milled Inches	Extreme Length Inches	Thickness of Heads Inches	Price, Each Unfinished	Price, Each Semi-finished	Price, Each Finished
677S	1/4 and 5/16	7/16 and 1/2	7 1/4	9/32	.23	.34	.47
679S	3/8 " 7/16	9/16 " 5/8	8 1/4	5/16	.29	.43	.58
681A	1/2 " 9/16	3/4 " 7/8	9 1/4	3/8	.38	.55	.72
683A	5/8 " 11/16	15/16 " 1	10 3/8	7/16	.50	.70	.90
685C	3/4 " 7/8	1 1/16 " 1 1/4	12	1/2	.70	1.00	1.30
Set No. 2-S—Price of Roll, 45 Cents Extra					2.10	3.02	3.97

GENERAL SERVICE SET, No. 3 LIGHT

WITH OPENINGS MILLED FOR TWELVE POPULAR NUT AND SCREW SIZES

No.	For Unclassified Nuts or Screws	Openings Milled Inches	Extreme Length Inches	Thickness of Heads Inches	Price, Each Unfinished	Price, Each Semi-finished	Price, Each Finished
675B	Twelve	3/8 and 7/16	6 1/4	1/4	.18	.27	.38
677B	popular	1/2 " 9/16	7 1/4	9/32	.23	.34	.47
679	milled	5/8 " 11/16	8 1/4	5/16	.29	.43	.58
681B	openings—	3/4 " 13/16	9 1/4	3/8	.38	.55	.72
683B	no	7/8 " 1	10 3/8	7/16	.50	.70	.90
685B	duplicates.	1 1/8 " 1 1/4	12	1/2	.70	1.00	1.30
Set No. 3—Price of Roll, 45 Cents Extra					2.28	3.29	4.35

WRENCHES

COES

KNIFE HANDLE

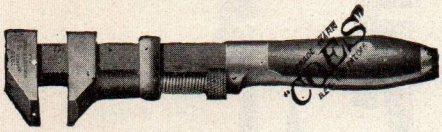


Fig. 22848A

STEEL HANDLE

Fig. 22848B

Size.....inches	6	8	10	12	15	18	21
Opens..... "	7/8	1¼	1¾	2⅛	2⅝	3	4⅛
Price, Black.....per dozen	**15.00**	**18.00**	**22.00**	**28.00**	**38.00**	**48.00**	**58.00**

BEMIS & CALL

BRIGGS PATTERN SCREW WRENCH

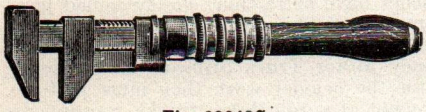


Fig. 22848C

COMBINATION WITH LONG NUTS

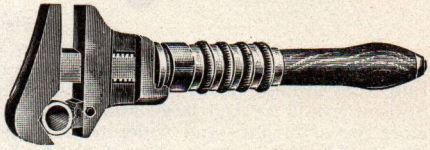


Fig. 22848D

BRIGGS PATTERN

Size.....inches	8	10	12	15	18
Opens..... "	1¾	2⅛	2¼	2¾	4
Price, Black.....per dozen	**12.00**	**14.00**	**18.00**	**24.00**	**32.00**

COMBINATION

Size.....inches	8	10	12	15	18
Takes Pipe Diameter..... "	¼ to ¾	¼ to 1	½ to 1¾	½ to 2¼	½ to 3
Price, Short Nut.....per dozen	**25.00**	**28.00**	**34.00**	**45.00**	**82.00**
" Long " ..... "	**27.00**	**30.00**	**36.00**	**48.00**	**87.00**

ENGINEERS'

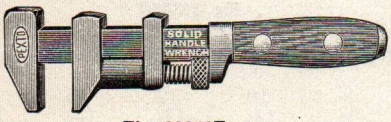


Fig. 22848E

TRIMO

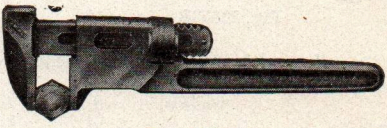


Fig. 22848F

ENGINEERS'

Size.....inches	6	8	10	12	15	18	21
Price, Black.....per dozen	**10.00**	**12.00**	**14.00**	**18.00**	**24.00**	**32.00**	**39.00**

TRIMO

Size.....inches	6	8	10	12	15	18	21
Price, Semi-bright....per dozen	**10.00**	**12.00**	**14.00**	**18.00**	**24.00**	**32.00**	**39.00**

WRENCHES

BONNEY AUTOMOBILE, MOTORCYCLE AND MOTOR TRUCK STILLSON WRENCHES

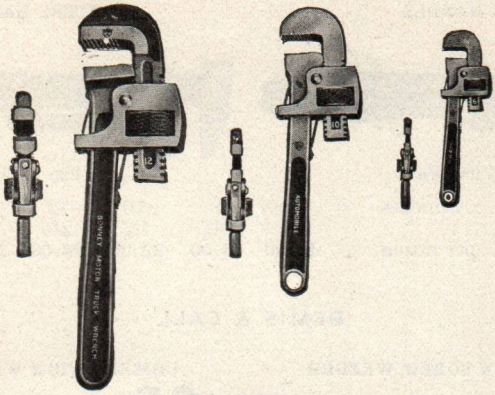


Fig. 30353A

Bonney Automobile and Motorcycle Wrenches have extra thin, closely milled jaws, with fine teeth that will not leave marks or injure fine motor parts. While the jaws are thin, they are extremely powerful and will permit work in close places where the ordinary Stillson would be too large and clumsy. Bonney Motor Truck Stillsons have thicker, more powerful jaws and wider teeth suitable for the heavier work they must perform. They hold an important place in the tool equipment of automobiles, trucks, motorcycles and tractors. Rigidly inspected under standard Government tests.

Style		Motorcycle	Automobile		Motor Truck
Size	inches	6	8	10	12
Length Open	"	6	8	10	12
Price	each	**1.25**	**1.50**	**1.75**	**2.00**

ADJUSTABLE WRENCHES

CRESCENT ADJUSTABLE END WRENCH

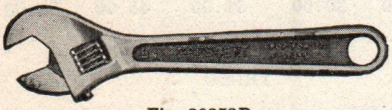


Fig. 30353B

WESTCOTT ADJUSTABLE S NUT WRENCH

Fig. 30353C

CRESCENT ADJUSTABLE END WRENCHES

Drop-forged bar and jaws. Unexcelled for strength and durability. Nicely polished ans casehardened.

Size	inches	4	6	8	10	12	15	18
Capacity	"	1/2	3/4	15/16	1 1/8	1 5/16	1 11/16	2 1/16
Price	per dozen	**7.80**	**7.80**	**9.60**	**12.00**	**18.00**	**27.00**	**39.00**

WESTCOTT ADJUSTABLE S NUT WRENCHES

Malleable iron handle, forged steel jaw. The Wescott wrench is acknowledged to be the most convenient and useful wrench for general use, and can be used in many places inaccessible to the monkey wrench.

Number		76	78	80	82	84
Length	inches	6	8	10	12	14
Opens	"	3/4	1	1 3/8	1 5/8	2
Price	per dozen	**8.00**	**10.00**	**12.00**	**18.00**	**24.00**

PIPE WRENCHES

STILLSON

WOOD HANDLE

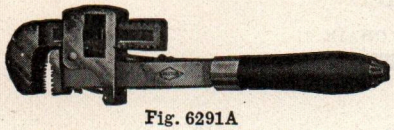


Fig. 6291A

STEEL HANDLE

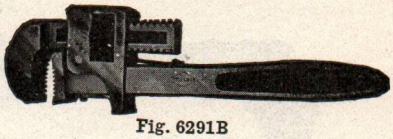


Fig. 6291B

Unless otherwise specified we will furnish wood handle wrenches in sizes from 6 to 14 inches. Steel handle wrenches in sizes from 18 to 48 inches.

Length, Open.....inches	6	8	10	14	18	24	36	48
Takes Pipe.....inches	⅛ to ½	⅛ to ¾	⅛ to 1	¼ to 1½	¼ to 2	¼ to 2½	¼ to 3½	1 to 5
Price.....each	2.00	2.25	2.50	3.50	5.00	7.25	13.50	20.00

EXTRA PARTS

JAW

Fig. 6291C

FRAME

Fig. 6291D

HANDLE

Fig. 6291E

NUT

Fig. 6291F

For Wrench.....inches	6	8	10	14	18	24	36	48
Price, Jaws.....each	.75	.80	.85	1.15	1.75	2.25	4.35	7.50
" Frames..... "	.38	.42	.50	.60	.75	.95	1.70	2.20
" Adjusting Nuts..... "	.12	.15	.20	.30	.35	.55	1.10	1.50
" Wood Handles..... "	.16	.16	.18	.25	...	....	....	....
" End Nuts..... "	.15	.15	.20	.20	...	....	....	....
" Frame Pins..... "	.03	.03	.04	.04	.04	.04	.05	.05
" Spring Rivets..... "	.01	.01	.02	.02	.02	.02	.02	.02
" Springs..... "	.10	.10	.10	.10	.10	.11	.13	.13

TRIMO

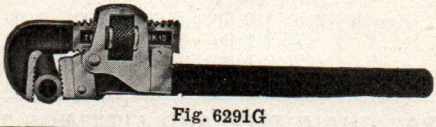


Fig. 6291G

Length, Open.....inches	6	8	10	14	18	24	36	48
Takes Pipe.....inches	⅛ to ½	⅛ to ¾	⅛ to 1	¼ to 1½	¼ to 2	¼ to 2½	½ to 3½	1 to 5
Price.....each	2.00	2.25	2.50	3.50	5.00	7.25	13.50	20.00

EXTRA PARTS

JAW

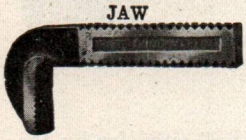


Fig. 6291H

FRAME

Fig. 6291J

INSERTED JAW

Fig. 6291K

NUT

Fig. 6291L

NUT WITH GUARDS INSERTED

Fig. 6291M

For Wrench.....inches	6	8	10	14	18	24	36	48
Price, Movable Jaws.....each	.75	.80	.85	1.15	1.75	2.25	4.35	7.50
" Inserted " ..... "	.35	.40	.50	.60	.70	.80	1.10	2.00
" Frames..... "	.38	.42	.50	.60	.75	.95	1.70	2.20
" Nuts..... "	.12	.15	.20	.30	.35	.55	1.10	1.50
" Springs..... "	.03	.03	.03	.03	.04	.04	.04	.04
" Frame Pins..... "	.03	.03	.04	.04	.04	.04	.05	.05
" Jaw Pins..... "	.03	.03	.04	.04	.04	.04	.05	.05

CHAIN TONGS
"VULCAN" IMPROVED

WITH FLAT LINK CHAIN

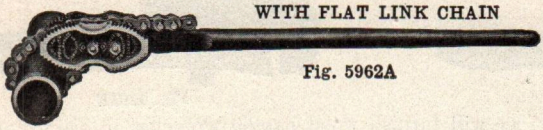


Fig. 5962A

Made from drop-forged and otherwise wrought steel, fully guaranteed. Are superior because of their reversible jaws. These may be quickly and easily changed end for end as the teeth first in use wear, thus doubling the life of the jaws—a unique feature, the value of which is readily apparent.

The reversible jaws being firmly fastened to the handle by two unusually tough steel studs or bolts, as shown by the illustration, cannot spread in use. One stud provides full working strength of tool; the other to be used for emergencies.

1896 PATTERN (OLD STYLE)

WITH CABLE CHAIN

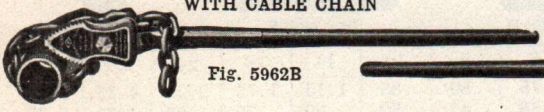


Fig. 5962B

WITH FLAT LINK CHAIN

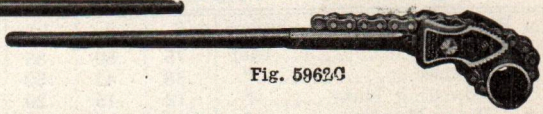


Fig. 5962C

As the 1896 pattern was the original double-jaw chain pipe wrench, we find this style still in demand by those with whom its efficiency has been established.

Number, Improved Pattern.....	30	31	32	33	33½	34	35	....
Number, Old Style.....	10	11	12	13	13½	14	15	16
Length .....inches	13¾	20	27	37	44½	50½	64½	87
Takes Pipe..... "	⅛ to ¾	⅛ to 1½	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12	4 to 18
Price, Complete.....each	2.50	3.50	5.00	7.00	9.00	11.00	18.00	40.00
" Extra Flat Link Chains..... "	.75	1.00	1.50	2.50	3.50	4.50	7.50	20.00
" " Cable Chains.... "	.75	1.00	1.50	2.50	3.50	4.50	7.50	20.00
" " Jaws.....per pair	1.00	1.75	2.75	4.00	4.75	5.50	7.50	16.00

"AGRIPPA" CHAIN PIPE AND FITTINGS TONGS

AS USED ON TEE

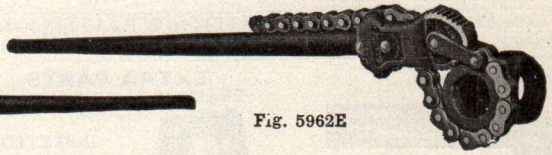


Fig. 5962E

AS USED ON NIPPLE

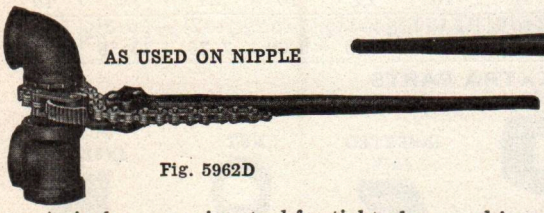


Fig. 5962D

A single narrow jaw tool for tight places and irregularities less well cared for by the broader jaw tools. Reduces greatly the labor in handling of short nipples, flange connections, irregular outlet fittings, drainage fittings, etc.

Number.....	20	21	22	23	23½	24	25
Length .....inches	13¾	20	27	37	44½	50½	64½
Takes Pipe Fittings..... "	⅛ to ¾	⅛ to 1½	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12
Price, Complete .....each	2.50	3.50	5.00	7.00	9.00	11.00	18.00
" Extra Jaws..... "	1.00	1.75	2.75	4.00	4.75	5.50	7.50
" " Chains..... "	1.00	1.25	1.75	2.75	4.00	5.00	8.00

CHAMPION CHAIN PIPE WRENCHES

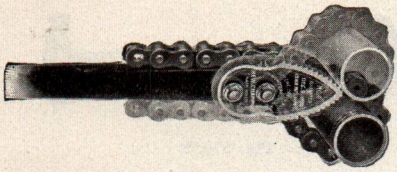


Fig. 16375A

In the design of these new Champion Chain Wrenches a new and very strong method of fastening or locking the chain to the jaws when the wrench is in use, has been devised.

This new method of fastening allows the wrench to be used under or over the pipe without the chain dropping out, and necessitates the use of a flat link chain with extended rivets through the links for locking, instead of the forged hook or pocket links as used on the old style wrench.

PARTS

These extended rivets in the chain drop into a positive lock forged on the inside of both jaws. The chain cannot under any condition become loose, slip or bind, and can be instantly released. It is made of special steel, carefully tested.

The principal strain is centered on two cylindrical projections which are forged on the end of the handle. These projections set into recesses in the jaws, giving double bearing surface where all the pull or strain comes on the wrench. This relieves the bolts of all strain and the possibility of the handle becoming loose is prevented.

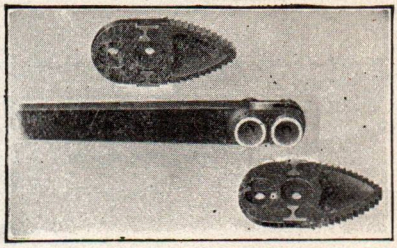


Fig. 16375B

The wrenches are all drop-forged from wrought steel. The equalized proportions throughout give greatest strength and durability with least possible weight. The handle will not bend. The teeth are of special design and are carefully tempered for file sharpening.

PRICES AND SPECIFICATIONS

Number	0	1	2
Length ... inches	12½	19½	28
Capacity ... "	⅛ to ¾	⅛ to 1½	¼ to 2½
Weight ... pounds	1¾	4¾	9
Tensile Strength of Chain ... "	3500	7000	10000
Price ... each	**2.50**	**3.50**	**5.00**
Extra Chains ... "	**.75**	**1.00**	**1.50**
" Handles ... "	**.75**	**1.00**	**1.50**
" Jaws ... pair	**1.00**	**1.75**	**2.75**

Number	3	4	5
Length ... inches	38¼	50½	65
Capacity ... "	¾ to 6	1½ to 8	2 to 12
Weight ... pounds	17½	32	57
Tensile Strength of Chain ... "	12500	16000	22000
Price ... each	**7.00**	**11.00**	**18.00**
Extra Chains ... "	**2.50**	**4.50**	**7.50**
" Handles ... "	**2.25**	**4.00**	**6.50**
" Jaws ... pair	**4.00**	**5.50**	**7.50**

PIPE CUTTERS

TRIMO

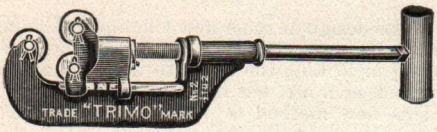


Fig. 9745A

BARNES

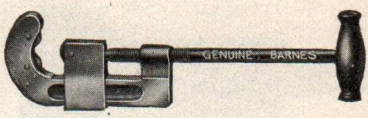


Fig. 9745B

TRIMO

Number	1	2	3
Cuts Pipe ....inches	⅛ to 1¼	¼ to 2	1 to 3
Price ....each	4.50	6.00	10.00
" Cutter Wheels .... "	.40	.40	.50
" " Wheel Pins with Cotter Pins ....per dozen	1.30	1.30	1.30
" Rollers ....each	.30	.30	.40

BARNES

Number	1	2	3	4	5	6	6½	7
Cuts Pipe ....inches	⅛ to 1	½ to 2	1½ to 3	2½ to 4	4 to 6	6 to 8	8 to 10	9 to 12
Price ....each	4.50	6.00	10.00	20.00	30.00	40.00	45.00	50.00
" Cutter Wheels.. per dozen	3.00	3.60	4.80	6.00	9.00	9.00	9.00	9.00
" Wheel Pins .... "	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00

SAUNDERS

ONE WHEEL AND ROLLER

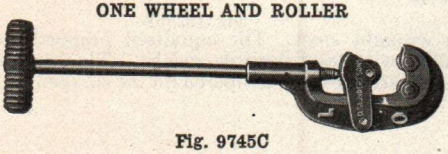


Fig. 9745C

THREE-WHEEL

Fig. 9745D

ONE WHEEL AND ROLLER

Number	1	2	3	4	5
Cuts Pipe ....inches	⅛ to 1	1 to 2	2 to 3	2½ to 4	4 to 6
Price ....each	3.00	4.50	11.00	18.00	28.00
" Blocks and Wheels .... "	1.25	1.75	2.75	3.50	4.00
" Cutter Wheels .... "	.24	.32	.60	.60	.60
" " Wheel Pins .... "	.10	.10	.15	.15	.15
" Rollers .... "	.24	.32	.50	.50	.60

THREE-WHEEL

Number	1	2	3	4
Cuts Pipe ....inches	⅛ to 1	1 to 2	2 to 3	2½ to 4
Price ....each	3.00	4.50	11.00	18.00
" Blocks and Wheels .... "	1.25	1.75	2.75	3.50
" Cutter Wheels .... "	.24	.32	60	.60
" " Wheel Pins .... "	.10	.10	.15	.15

NYE PIPE CUTTERS

Fig. 806A

Equipped with Nye Knurled Cutter Wheels (knife-blade), the kind that act like a saw, cut faster and cleaner than any others and leave no burr to be filed off.

No. 1 cuts ⅛ to 1¼-inch pipe. No. 2 cuts ½ to 2-inch pipe. No. 2, as illustrated, is tapped at the bottom for extra handle, which obviates reaching around or over the pipe at each end.

Rollers and cutter wheels in the Nye cutter are larger with wider bearings than others, insuring much longer life as well as easier operation. Bearing pins are made of tool steel.

Number		1	2
Cuts Pipe	inches	⅛ to 1¼	½ to 2
Price, One-wheel	each	3.00	4.50
" Three-wheel	"	3.80	5.30

NYE KNURLED CUTTER WHEELS

These wheels have a thin blade, less than 1/16 inch thick and perfectly straight from the hub to outer edge. The cutting edge is knurled and ground to a sharpe edge. They do not simply spread the metal apart, but make a square clean cut and do the work easier than common cutter wheels. Guaranteed to cut through pipe with fewer turns of cutter and less labor than any other type of cutter wheel. Cannot be broken in any ordinary use. Made of the finest tool steel and tempered in oil.

Made to fit all standard makes of pipe cutters, such as Nye, Barnes, Saunders, Armstrong and Trimo.

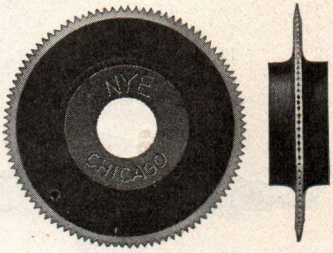
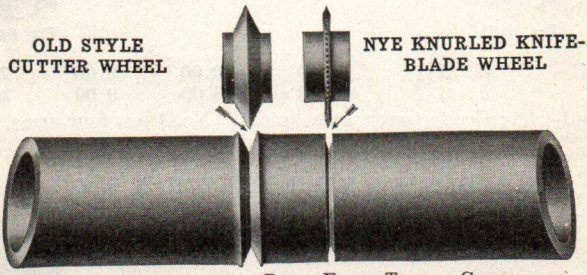


Fig. 806B



No.	Price, Each—Type of Cutter: Barnes	Saunders	Nye	Trimo
1	.50	.50	.70	.60
2	.60	.60	.80	.60
3	.80	1.10	...	.90
4	1.00	1.10	...	...
5	1.10	1.10	...	...

NYE CUTTER WHEEL PINS

Made for all standard makes of pipe cutters.

Number		1	2	3	4	5
Price, Barnes Type	per dozen	1.00	1.00	1.00	2.00	2.00
" Saunders "	"	1.20	1.20	1.80	1.80	1.80
" Trimo "	"	1.00	1.00	1.00	....	....
" Nye "	"	1.20	1.80	....	....	....

PIPE STOCKS AND DIES

MALLEABLE STOCKS AND DIES

No. 0

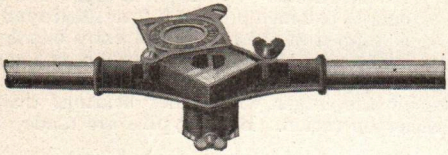


Fig. 6463A

No. 2

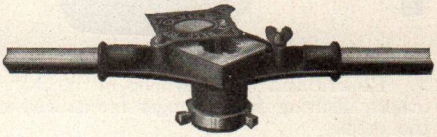


Fig. 6463B

No.	Threads Pipe Inches	Dimensions of Dies Inches	Price, Each: Complete	Stocks only	Extra Dies	Extra Bushings	Extra Die Frames
0	1/8 to 1/2	2 x 1/2	8.00	3.00	1.40	.30	...
1	1/4 " 1	2 1/2 x 3/4	10.50	3.50	1.60	.40	.30
1 1/2	3/4 " 1 1/4	3 x 3/4	9.50	4.00	2.00	.60	.40
1 3/4	1 " 1 1/2	3 x 3/4	9.50	4.00	2.00	.60	.40
2	1 1/4 " 2	4 x 7/8	14.50	8.50	2.50	.75	.50

No. 3

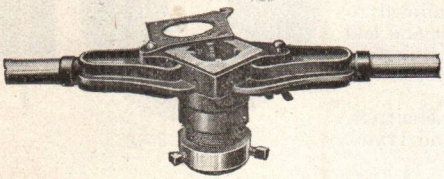


Fig. 6463C

No. 4

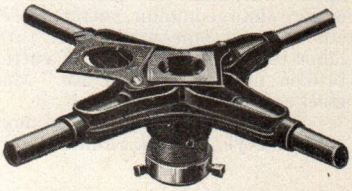


Fig. 6463D

3	2 1/2 to 3	5 x 1 1/4	35.00	20.00	9.00	2.00	.60
4	2 1/2 " 3	5 x 1 1/4	42.00	26.00	9.00	2.00	.60

Nos. 2, 3 and 4 have leader screw attachment. No. 4 has four arms.

MILLERS' REVERSIBLE RATCHET STOCKS

No. B

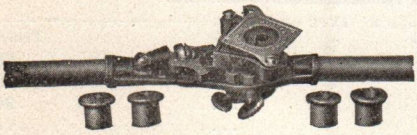


Fig. 6463E

Nos. C, D AND E

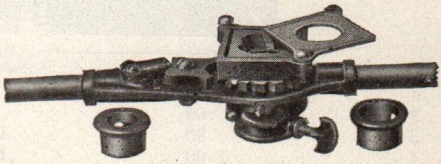


Fig. 6463F

Size	Threads Pipe Inches	Dimensions of Dies Inches	Price, Each: Complete	Stocks only	Extra Dies	Extra Bushings	Extra Die Frames
B	1/4 to 1	2 1/2 x 3/4	15.00	7.50	1.50	.25	.22
C	1 " 1 1/2	3 x 3/4	18.50	13.00	1.80	.35	.30
D	1 1/4 " 2	4 x 7/8	20.00	12.50	2.50	.45	.38
E	2 1/2 and 3	5 x 1 1/4	44.50	29.00	7.75	.85	.45

Sizes C, D and E have leader screws.

TOLEDO PIPE THREADING DEVICES

No. 0 ADJUSTABLE THREADING DEVICES

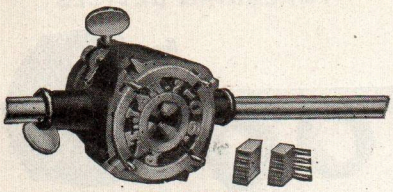


Fig. 23106A

No. 0 is a popular little tool. It cuts ½ and ¾-inch threads with one set of dies; ¼ and ⅜-inch threads with another set, and ⅛-inch threads with another set. It differs from other tools of the same capacity in that it uses the receding-die principle for threading ½ and ¾-inch pipe, thus making it an easy operating tool. It is very light and compact, being only 24 inches long from tip to tip of the handles.

Threads Pipe.....inches	⅛ to ¾
No. of Sets of Dies to Stock...	3
Price, Complete.....each	**16.00**
" Dies, per Set of 4 Segments	**2.50**

No. 00 RATCHET THREADING DEVICES

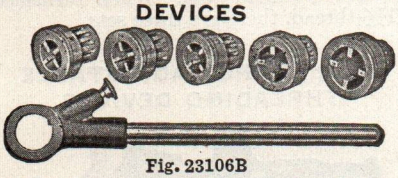


Fig. 23106B

This is a remarkably simple, handy little pipe threader. Operates easily, and produces perfectly true tapered threads. Dies changed instantly by pulling the pawl and dropping one die head out or another size in, ready for use. If the complete tool is not wanted, a combination can be made up as required.

Price, Ratchet only.....each	**3.00**
" ⅛, ¼ or ⅜-inch Die Heads with Dies.....each	**3.00**
Price, ½ or ¾-inch Die Heads with Dies.....each	**3.50**
Price, Special Oak Case..... "	**1.00**

When the dies wear out new ones can be bought without buying the whole die head, at a price of 2.00 per set of 4 segments. The dies can be taken from the die heads, however, and reground several times, so they will last a long while, if given proper care.

No. 1 ADJUSTABLE THREADING DEVICES

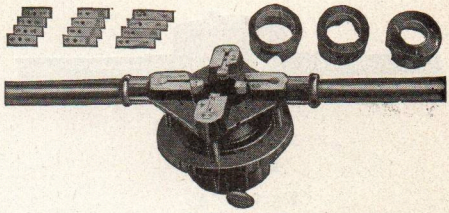


Fig. 23106C

No. 1 is and has been for a number of years, a very popular threading device. It threads 1, 1¼, 1½ and 2-inch pipe. It is perfectly easy for one man to cut 2-inch threads with same. It is made both as a right-hand and a left-hand tool—neither will do both. Right-hand furnished unless otherwise specified.

Threads Pipe.....inches	1 to 2
No. of Sets of Dies to Stock.....	4
Price, Complete.....each	**24.00**
" Dies, per Set of 4 Segments.	**2.50**

No. 1A ADJUSTABLE RATCHET THREADING DEVICES

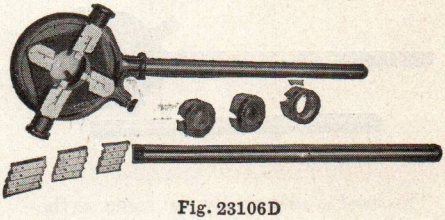


Fig. 23106D

No. 1A is in every essential like the No. 1, except that it is equipped with a ratchet. It may be used with two handles as an ordinary die stock, or with one handle inserted in the ratchet case. It is desirable for threading pipe down a trench, or against walls, between rafters, etc. Right-hand furnished unless otherwise specified.

Threads Pipe.....inches	1 to 2
No. of Sets of Dies to Stock.....	4
Price, Complete.....each	**30.00**
" Dies, per Set of 4 Segments.	**2.50**

TOLEDO ADJUSTABLE PIPE THREADING DEVICES

No. 10 ADJUSTABLE THREADING DEVICES

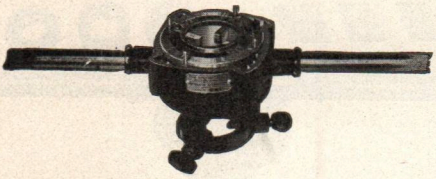


Fig. 23107A

The No. 10 threads the entire range of sizes from 1 to 2 inches with one set of dies.

While this is not the best practice from the standpoint of die service, still this tool is remarkably efficient and threads pipe very easily.

Threads Pipe.....inches	1 to 2
No. of Sets of Dies to Stock.....	1
Price, Complete.....each	**28.00**
" Dies, per Set of 4 Segments	**2.75**

No. 10A ADJUSTABLE RATCHET THREADING DEVICES

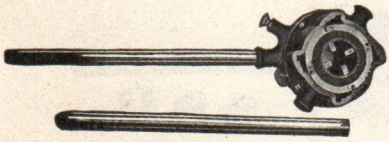


Fig. 23107B

This tool is identically the same as the No. 10, except that it has a ratchet attachment, making it desirable for use in close places where the space is restricted. The dies are of high-speed steel.

Threads Pipe.....inches	1 to 2
No. of Sets of Dies to Stock.....	1
Price, Complete.....each	**34.00**
" Dies, per Set of 4 Segments	**2.75**

Left-hand dies can be used in the above tools, and can be furnished on special order. It requires, however, a separate set of left-hand dies for each size pipe.

No. 1½R ADJUSTABLE RATCHET THREADING DEVICES

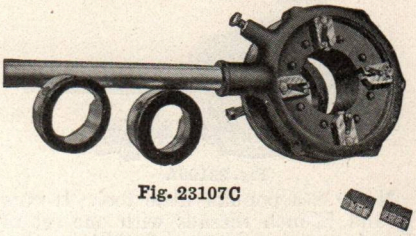


Fig. 23107C

No. 1½R is offered for those who do not require to thread pipe larger than 3-inch and who do not want to invest as much money as the Toledo No. 2 costs. Its capacity is limited to two sizes, viz.; 2½ and 3-inch—8 thread. Can be furnished with 2, 2½ and 3-inch, 11½-pitch threads for pipe or tubing, when so ordered, at same price.

Threads Pipe.....inches	2½, 3
No. of Sets of Dies to Stock.....	*2
Price, Complete.....each	**50.00**
" Dies, per Set of 4 Segments	**4.00**

* For 8-thread tool. When furnished 11½-thread, there are three sets.

No. 2 GEARED ADJUSTABLE THREADING DEVICES

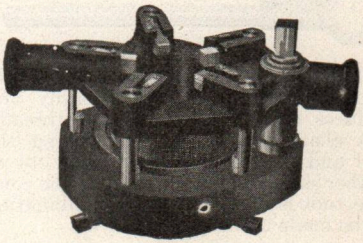


Fig. 23107D

This tool is light, compact and very easy in operation. Neither is the ease of operation obtained at the expense of speed.

Complete with dies, ratchet and driving cross.

Threads Pipe.....inches	2½ to 4
No. of Sets of Dies to Stock...	4
Price, Complete.....each	**100.00**
" Dies, per Set of 5 Segments	**8.00**

TOLEDO ADJUSTABLE PIPE THREADING DEVICES

No. 25 GEARED ADJUSTABLE THREADING DEVICES

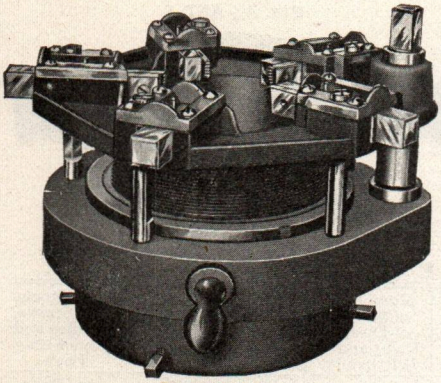


Fig. 23100A

The No. 25 device was originally furnished without any bushings and had micrometer line set screws for centering the tool on the pipe, but is now furnished with bushings as part of the equipment. The bushings are of special long barrel design which will facilitate the easy centering of the tool on the pipe.

This model differs from other Toledo Tools of similar capacity in that it is constructed to utilize but one set of dies for threading the entire range of sizes (seven).

The adjustment of the dies is not accomplished by the use of a cam plate and the weakness of that form of construction has therefore been eliminated.

Two sets of dies are furnished with this model, so that when one set is dull and needs regrinding another set will be on hand to take its place.

A ratchet handle with a leverage of about 3 feet, and a driving cross intended to be used with pipe handles 2 or 3 feet long, are supplied with this device

Threads Pipe	inches	2½ to 6
Net Weight	pounds	152
Price	each	230 00
" Extra Dies	per set	8 00

* Complete, with dies, ratchet and driving cross.

Toledo Dies are made of the best obtainable steel regardless of its price.

No. 3 GEARED ADJUSTABLE THREADING DEVICES

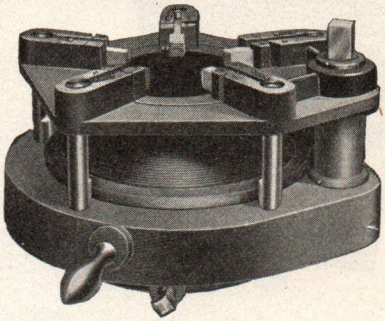


Fig. 23100B

This tool is light, compact and easy in operation. It is strictly portable. One man can easily and quickly cut an 8-inch thread with it.

Complete with dies, ratchet and driving cross.

Threads Pipe	inches	4½ to 8
No. of Sets of Dies to Stock		5
Price, Complete	each	300.00
" Dies, per Set of 5 Segments		12.00

No. 4 GEARED ADJUSTABLE THREADING DEVICES

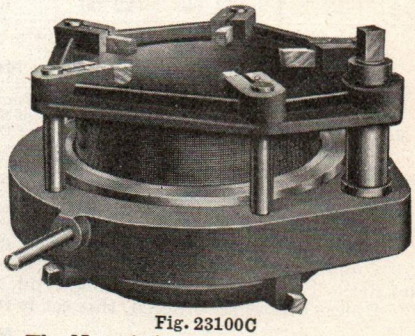


Fig. 23100C

The No. 4 is for use in all fields where it is desirable and necessary occasionally to cut threads on large size pipe. It may be taken to the pipe anywhere and operated Complete with dies, ratchet and driving cross.

Threads Pipe	inches	9, 10, 12
No. of Sets of Dies to Stock		3
Price, Complete	each	500.00
" Dies, per Set of 5 Segments		20.00

ARMSTRONG ADJUSTABLE PIPE STOCKS AND DIES

Nos. 1 AND 2

Fig. 8327A

Nos. 2½ AND 3

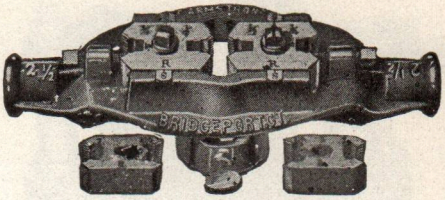


Fig. 8327B

NO. 1

No.	Threads Pipe Inches	Price, Complete Each		Number of Sets of Dies Right-hand	Number of Sets of Dies Right and Left-hand	Price Extra Dies Right or Left-hand per Set	Price Extra Bushings Each	Price, Stocks with Screws, Handles and Wrench only Each
		Right-hand	Right and Left-hand					
1	⅛ to ½	9.00	14.00	4	8	1.60	.30	3.25

Unless otherwise specified, this set is furnished ⅛ to ½-inch, right-hand.

NO. 2

No.	Threads Pipe Inches	Price, Complete Each		Number of Sets of Dies Right-hand	Number of Sets of Dies Right and Left-hand	Price Extra Dies Right or Left-hand per Set	Price Extra Bushings Each	Price, Stocks with Screws, Handles and Wrench only Each
		Right-hand	Right and Left-hand					
2	¼ to 1	12.00	20.00	5	10	2.00	.40	4.00
2	⅛ " 1	14.00	22.00	6	12	2.00	.40	4.00

Unless otherwise specified, this set is furnished ¼ to 1-inch, right-hand.

NO. 2½

No.	Threads Pipe Inches	Price, Complete Each		Number of Sets of Dies Right-hand	Number of Sets of Dies Right and Left-hand	Price Extra Dies Right or Left-hand per Set	Price Extra Bushings Each	Price, Stocks with Screws, Handles and Wrench only Each
		Right-hand	Right and Left-hand					
2½	½ to 1¼	14.00	21.00	*2	4	3.50	.60	5.25
2½	¼ " 1¼	20.00	27.00	†4	8	**3.50	.60	5.25

*Two sets double-end dies, ½x¾ and 1x1¼-inch. †Two sets double-end dies, ½x¾ and 1x1¼-inch, and two sets single-end dies, ¼ and ⅜-inch. **Is list of double-end dies. Sizes, ¼ or ⅜-inch, single-end, 2.50 per set.

Unless otherwise ordered, this set is furnished ½ to 1¼-inch, right-hand.

NO. 3

No.	Threads Pipe Inches	Price, Complete Each		Number of Sets of Dies Right-hand	Number of Sets of Dies Right and Left-hand	Price Extra Dies Right or Left-hand per Set	Price Extra Bushings Each	Price, Stocks with Screws, Handles and Wrench only Each
		Right-hand	Right and Left-hand					
3	1¼ to 2	18.00	30.00	3	6	4.50	.75	7.00
3	1 " 2	21.00	37.00	4	8	4.50	.75	7.00
3	¾ " 2	24.00	44.00	5	10	4.50	.75	7.00
3	½ " 2	27.00	51.00	6	12	4.50	.75	7.00

Unless otherwise ordered, this set is furnished 1 to 2-inch, right-hand.

ARMSTRONG ADJUSTABLE PIPE STOCKS AND DIES

No. 6

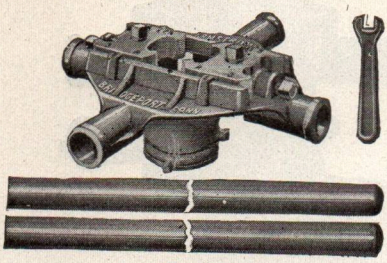


Fig. 8336A

No. 7

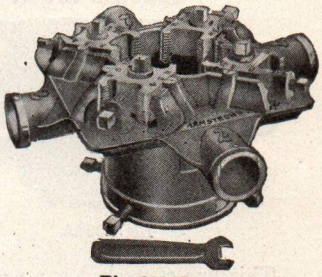


Fig. 8336B

No. 6

No.	Threads Pipe Inches	Price, Complete Each Right-hand	Price, Complete Each Right and Left-hand	Number of Sets of Dies Right-hand	Number of Sets of Dies Right and Left-hand	Price Extra Dies Right or Left-hand per Set	Price Extra Bushings Each	Price, Stocks with Screws Handles and Wrench only Each
6	2½ and 3	45.00	60.00	*1	2	17.00	2.00	25.00

*Double-end. The change from 2½ to 3-inch is made by simply reversing the dies end for end.

Unless otherwise ordered, this set is furnished 2½ and 3-inch, right-hand.

No. 7

No.	Threads Pipe Inches	Price, Complete Each Right-hand	Price, Complete Each Right and Left-hand	Number of Sets of Dies Right-hand	Number of Sets of Dies Right and Left-hand	Price Extra Dies Right or Left-hand per Set	Price Extra Bushings Each	Price, Stocks with Screws, Handles and Wrench only Each
7	2½ to 4	75.00	110.00	*2	4	20.00	3.00	30.00
7	2½ and 3	55.00	75.00	1	2	20.00	3.00	30.00
7	3½ " 4	55.00	75.00	1	2	20.00	3.00	30.00

*These dies are double-end and come in sets of four pieces. One set is threaded for 2½-inch on one end and 3-inch on the opposite end, and one set is threaded for 3½-inch on one end and 4-inch on the other end.

Sent 2½ to 4-inch, right-hand, unless otherwise ordered.

RATCHET ATTACHMENT

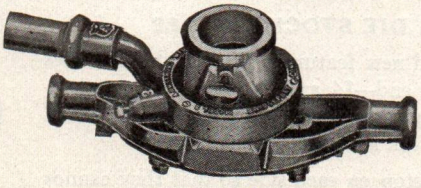


Fig. 8336C

Can be used either right or left by reversing pawl without removing from stock. With this attachment any Armstrong stock becomes a ratchet stock and die.

For Stock.....	Number	2	2½	3	6	7
Price.....	each	2.50	3.00	3.50	5.00	5.00

OSTER BULLDOG DIE STOCKS

REGULAR STOCK

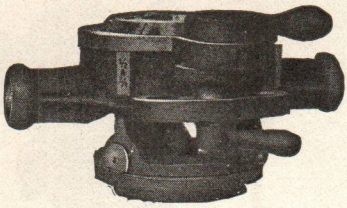


Fig. 6934A

RATCHET STOCK

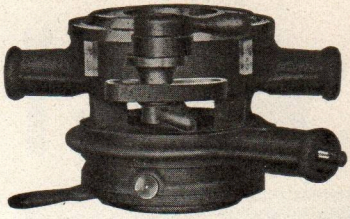


Fig. 6934B

This line of stocks has a positive setting arrangement without the use of any thumb screws or friction clamps of any kind. The dies are controlled by the lever handle on top, as shown in illustration. By moving this handle to the right as far as it will go, the dies are set and held in place while cutting. One movement of the top lever handle will open or close the dies. No resetting or backing off the threads.

The tool is equipped with adjustable guides which do away with loose bushings. These guides are operated on a scroll and can be set for all sizes the tool will thread. The scroll is constructed so that the guides are held in any position without locking. The more pressure on the ends of the guides, the more solid the locking arrangement. Great pressure on the ends of the guides only tends to lock them more firmly in position.

Range of Sizes of Pipe, Inches				Regular Stocks		Ratchet Stocks		Extra Dies per Set (4 Pieces)
One Set	One Set	One Set	One Set	No.	Price Each	No.	Price Each	
1/8	1/4 and 3/8	1/2 and 3/4	.....	101	13.00	.....	....	2.50
1/4 and 3/8	1/2 " 3/4	1 " 1 1/4	.....	102	17.00	102R	20.00	3.00
1 " 1 1/4	1 1/2 " 2	.....	.....	103	22.00	103R	27.00	3.50
1/2 " 3/4	1 " 1 1/4	1 1/2 and 2	.....	104	25.00	104R	30.00	3.50
1/4 " 3/8	1/2 " 3/4	1 " 1 1/4	1 1/2 and 2	104 1/2	28.00	104 1/2 R	33.00	3.50
1 1/2 " 2	2 1/2 " 3	.....	.....	105	40.00	105R	50.00	5.00
1 " 1 1/4	1 1/2 " 2	2 1/2 and 3	.....	105 1/2	43.00	105 1/2 R	53.00	5.00
2 1/2 " 3	3 1/2 " 4	.....	.....	107	55.00	107R	60.00	6.00
1 1/2 " 2	2 1/2 " 3	3 1/2 and 4	.....	107 1/2	58.50	107 1/2 R	63.50	6.00
.....	2 1/2 " 3	3 1/2 " 4	4 1/2 and 5	....	....	108R	75.00	10.00
1 1/2 " 2	2 1/2 " 3	3 1/2 " 4	4 1/2 " 5	....	....	108 1/2 R	80.00	10.00

BULLDOG DIE STOCKS, No. 82

This tool has brand new features. The double-end dies (1/4 and 3/8-inch on one end—1/2 and 3/4-inch on the other) are protected by a casing; hence teeth cannot cut user's hands or be damaged when stock is thrown about.

The dies have a stop on each side so that they cannot be set beyond proper place in stock.

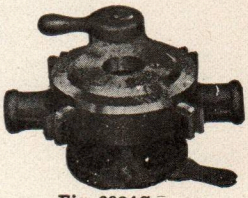


Fig. 6934C

Price, Complete, Cutting 1/4, 3/8, 1/2 and 3/4 inch.....each	13.00
" Extra Dies, Right or Left.....per set (four pieces)	3.50
" " for 1/8-inch Dies..... " " "	3.50

OSTER DIE STOCKS AND PIPE MACHINES

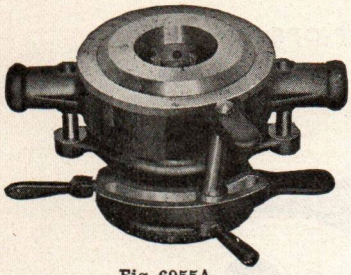


Fig. 6955A

MATCHLESS DIE STOCKS

Receding dies. No loose bushings. No change of guides. Easy cutting dies. Protected leader screw.

Number	1B	3B	*3BR	*4BR
Threads Pipe..inches	½&¾	1 to 2	1 to 2	2½ to 4
Weight.....pounds	10	25	36	120
Price, Complete, each	**14.50**	**30.00**	**35.00**	**80.00**
" Extra Dies...per set	**2.50**	**3.50**	**3.50**	**10.00**

*Ratchet.

GEARED DIE STOCKS

With adjustable centering chuck. These are portable pipe tools. Can be used as a die stock, as a bench tool, or complete with tripod stand. Strictly a one-man outfit.

These tools have no leader screw; the dies are started with a lever handle. One movement of the lever brings the head to position for the next cut without backing over the finished threads. No pipe vise required.

Number	16	17
Threads Pipe.....inches	2½ to 4	2½ to 6
Shipping Weight, with Bracket...pounds	310	425
" " " Tripod.. "	400	550
Sets of Dies.....	1	4
Price, with Bench Bracket...each	**110.00**	**185.00**
" " Tripod..... "	**125.00**	**200.00**
" Extra Dies..per set of four pieces	**9.00**	**11.00**

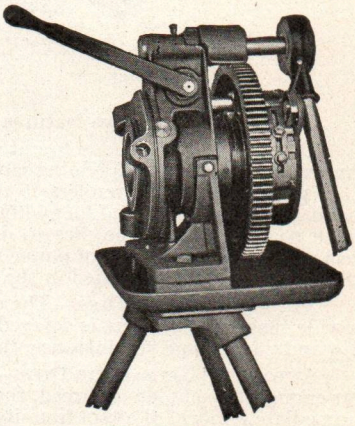


Fig. 6955B

Nos. 204 AND 206

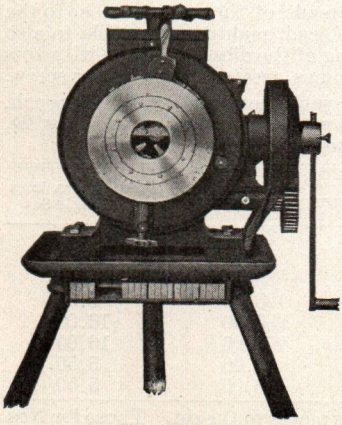


Fig. 6955C

HAND MACHINES

The dies in these machines are self-locking with one movement of the setting handle. Throw it one way and the pipe is released; throw it the other way and the dies are set to the same size. The dies thread two sizes without change. Vise is self-centering and straight threads are assured. Gears are all machine cut and entirely protected from chips or accidents.

Number	*201	204	206
Threads and Cuts off Pipe..inches	¼ to 2	1 to 4	1 to 6
Sets of Dies.....	4	4	6
Price, with Tripod and Pan....each	**105.00**	**225.00**	**375.00**
Deduct for Tripod..... "	**10.50**	**15.00**	**37.50**
" " Oil Pan.... "	**4.50**	**6.00**	**9.00**
Extra Dies, R. or L..per set of four pieces	**4.50**	**6.00**	**7.50**

*No. 201 does not have a cutting-off attachment.

HART'S "BUCKEYE" DIE STOCKS

FOR PIPE

No. 23½, WITHOUT CUT-OFF

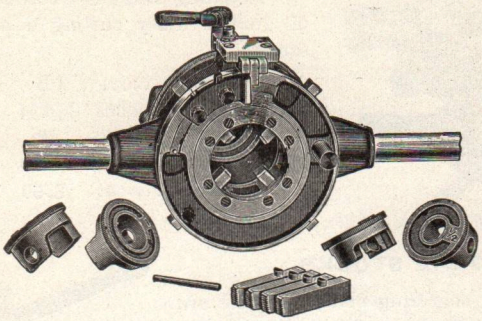


Fig. 6540A

The several distinctive features of these tools are best mentioned in detail.

Dies.—These are made to cut easily by being formed with a short cutting edge and by the automatically expanding movement which they have as they are screwed onto the pipe, and which renders it possible, with such short edges, to produce threads having the taper essential for making tight joints. These cutting edges are furthermore made so as to induce the dies to do their work without the aid of a leader screw. The remarkably small amount of power needed for such dies is explained mostly by the reduction of the friction generated in the case of dies with cutting edges of the usual length.

Adjustability of Dies.—The dies themselves, and the stock are so constructed that a wide range of diameters is covered by one set of dies, a single set being used for 1, 1¼, 1½ and 2-inch pipe, for instance, thus avoiding changes and the care of additional parts.

Automatic Release of Dies.—As soon as the dies have been screwed onto the pipe far enough to complete a thread, they stop cutting and release themselves, permitting the immediate removal of a tool from its work.

Die Leading Device.—Instead of a leader screw, ordinarily used with the narrow, expanding style of dies, there is a leader ring which automatically causes the dies to start without any hand pressure, and through its employment the thread cutting that a tool is capable of doing, is not limited simply to threads of the same number to the inch, as are on a leader screw, nor to one direction of lead, making it possible to also thread either right or left-handed. There is no reversing of the dies to be done with this device, nor screwing apart of pieces. Its life is many times greater than a leader screw.

Nos. 25, 26 and 26½ are provided with gears which, with the aid of a ratchet wrench, enable all the work to be done by one man, the same as with the smaller sizes. Nos. 24, 28 and 28½ are of a ratchet pattern, especially adapted to work in close quarters.

Number	Pipe Threading Sizes Inches	Number of Sets of Dies	Price, Each		Price, Extra Dies per Single Set
			Without Cut-Off	With Cut-Off	
23	1, 1¼, 1½, 2	1	30.00	35.00	5.50
23½	½, ¾, 1, 1¼, 1½, 2	2	35.00	40.00	5.50
24	1½, 2, 2½, 3	2	80.00	88.00	9.00
25	2½, 3, 3½, 4	1	115.00	125.00	9.00
26	4½, 5, 6	1	220.00	235.00	16.00
26½	2½, 3, 3½, 4, 4½, 5, 6	2	240.00	255.00	16.00
28	1, 1¼, 1½, 2	1	36.00	41.00	5.50
28½	½, ¾, 1, 1¼, 1½, 2	2	41.00	46.00	5.50

Dies for Nos. 23, 23½, 24, 25, 28, and 28½ have four pieces to the set. Those for Nos. 26 and 26½ have six pieces.

HART'S DUPLEX DIE STOCKS

Nos. 41 TO 49

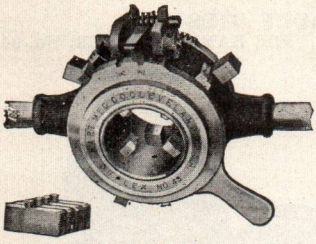


Fig. 3394A

These tools are fitted with adjustable dies and guide or centering jaws. What may be spoken of as the distinguishing features between them and other similar tools, are the means for setting the dies to size, for holding the dies in position, and releasing them at the end of a cut. The setting is done with great accuracy and by simply using the hand. The holding does not depend on any frictional clamps, screws or nuts, but on a positive lock. The releasing is accomplished instantly and avoids turning back.

The dies are of the chaser form, the most readily adjusted and sharpened. They do their work while held stationary. Quick adjustment enables the operator to at once alter size of threads, so as to suit any variation in pipe fittings.

The guide jaws center the pipe accurately to the dies; they are adjusted simultaneously to all sizes of pipe. The mechanism for accomplishing it is self-locking, and its adjustment cannot be accidentally disturbed.

The cutting-off device, as has been customary, is also furnished in the equipment of the tools, unless its omission be specified. It cuts the pipe squarely and cleanly.

No.	Threads, Pipe, Inches	Price, Each		Extra Dies			Price, Extra Cutting-Off Tools Each
		Without Cut-Off	With Cut-Off	Price Complete Set	Single Sets in Complete Set	Price of Single Set (4 Pieces)	
41	¼, ⅜, ½, ¾	12.00	15.00	5.20	2	2.60	.75
41½	⅛, ¼, ⅜, ½, ¾	14.00	17.00	7.80	3	2.60	.75
42	½, ¾, 1, 1¼	15.50	18.50	6.20	2	3.10	.75
42½	¼, ⅜, ½, ¾, 1, 1¼	17.00	20.00	9.30	3	3.10	.75
43	1, 1¼, 1½, 2	22.00	25.00	7.40	2	3.70	.75
43½	½, ¾, 1, 1¼, 1½, 2	25.00	28.00	11.10	3	3.70	.75
44	1½, 2, 2½, 3	40.00	45.00	13.00	2	6.50	.90
45	2½, 3, 3½, 4	55.00	60.00	15.00	2	7.50	.90
*47	½, ¾, 1, 1¼	18.50	21.50	6.20	2	3.10	.75
*47½	¼, ⅜, ½, ¾, 1, 1¼	20.00	23.00	9.30	3	3.10	.75
*48	1, 1¼, 1½, 2	25.00	28.00	7.40	2	3.70	.75
*48½	½, ¾, 1, 1¼, 1½, 2	28.00	31.00	11.10	3	3.70	.75
*49	2½, 3, 3½, 4	60.00	65.00	15.00	2	7.50	.90

*Ratchet pattern.

Nos. 51 TO 52½

These particular sizes of tools are constructed like the Nos. 41 to 45, but for some ranges of diameters they are fitted with dies of the double-ended form, each end of which is capable of threading two diameters. With a single set of such dies, therefore, it is possible to cut threads on four different diameters of pipe, and this makes the tools especially suited to certain classes of work that necessitate their being carried about considerably.

Extra dies per set (four pieces), Nos. 51 and 51½: ⅛-inch, single-ended, 2.60; ¼ to ¾-inch, double-ended, 5.20. Nos. 52 and 52½: ¼ and ⅜-inch, single-ended, 3.10; ½ to 1¼-inch, double-ended, 6.20.

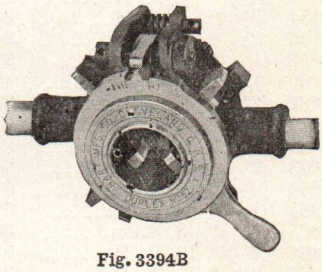


Fig. 3394B

Number	Threads Pipe Inches	Price, Each	
		Without Cut-Off	With Cut-Off
51	¼, ⅜, ½, ¾	12.00	15.00
51½	⅛, ¼, ⅜, ½, ¾	14.00	17.00
52	½, ¾, 1, 1¼	15.50	18.50
52½	¼, ⅜, ½, ¾, 1, 1¼	17.00	20.00

FORBES PIPE CUTTING AND THREADING MACHINES

WITH OPENING AND ADJUSTABLE DIES

FOR HAND, No. 56

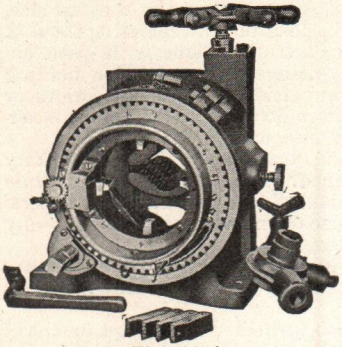


Fig. 7104A

FOR HAND OR POWER, No. 94

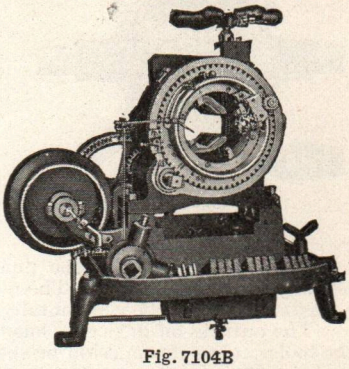


Fig. 7104B

HAND MACHINES				HAND OR POWER MACHINES			
Number	Threads Pipe, Inches	Approx. Net Wt., Lbs.	Price Each	Number	Threads Pipe, Inches	Approx. Net Wt., Lbs.	Price Each
*30	¼ to 2, R. and L....	155	**170.00**	*70	¼ to 2, R. and L...	376	**335.00**
*32	¼ to 2, R & L For Solid Dies Dies not Furnished.....	140	**150.00**	*72	¼ to 2, R & L For Solid Dies Dies not Furnished.....	352	**320.00**
*34	1 to 3, R. H., 1 to 2, L. H....	185	**250.00**	*74	1 to 3, R. H., 1 to 2, L. H.....	491	**420.00**
*36	¾ to 3, R. H., ¾ to 2, L. H.	190	**285.00**				
*37	¼ to 3, R. and L...	200	**350.00**	*76	¾ to 3, R. H., ¾ to 2, L. H.....	484	**450.00**
*38	1½ " 4, R. H.....	251	**335.00**				
*40	1½ " 4, R. and L...	257	**385.00**	*77	¼ to 3, R. and L..	490	**520.00**
*42	1 " 4, R. H.....	253	**370.00**	†78	2½ " 4, R. H.....	652	**470.00**
*44	1 " 4, R. and L...	260	**435.00**	*80	1½ " 4, R. H.....	644	**500.00**
†46	2½ " 4, R. H.....	237	**285.00**	*82	1½ " 4, R. and L..	665	**550.00**
†50	4 " 6, R. H.....	341	**385.00**	*84	1 " 4, R. H.....	662	**535.00**
†52	3½ " 6, R. H.....	341	**435.00**	*86	1 " 4, R. and L..	648	**600.00**
†54	2½ " 5, R. H.....	343	**500.00**	†88	4 " 6, R. H.....	758	**570.00**
†56	2½ " 6, R. H.....	345	**585.00**	†90	3½ " 6, R. H.....	802	**600.00**
*58	1 " 6, R. H.....	384	**635.00**	†92	2½ " 5, R. H.....	810	**670.00**
*60	1 " 6, R. and L...	404	**785.00**	†94	2½ " 6, R. H.....	800	**750.00**
*61	2½ " 6, R. and L...	398	**685.00**	*95	2½ " 6, R. and L..	818	**850.00**
†62	2½ " 6, R. H. Ex. Hy. .	815	**1000.00**	*96	1 " 6, R. H.....	860	**835.00**
*62½	1 " 6, R. and L...	845	**1170.00**	*98	1 " 6, R. and L..	881	**950.00**
*63	2½ " 8, R. and L...	661	**1200.00**	*98½	1 " 8, R. H.....	1359	**1785.00**
†64	2½ " 8, R. H.....	673	**1085.00**	*99	2½ " 8, R. and L..	1326	**1785.00**
*65	1 " 8, R. H.....	671	**1200.00**	*99½	1 " 8, R. and L..	1370	**1900.00**
*65½	1 " 8, R. and L...	660	**1320.00**	†100	2½ " 8, R. H.....	1500	**1670.00**
†66	2½ " 10, R. H.....	989	**1670.00**	†102	2½ " 10, R. H.....	2025	**2335.00**
*67	2½ " 10, R. H.....	995	**1670.00**	*104	2½ " 10, R. H.....	2150	**2335.00**
*68	2½ " 10, R. and L...	1025	**1835.00**	*106	2½ " 10, R. and L..	2200	**2500.00**
†69	2½ " 12, R. H.....	2293	**2170.00**	†107	2½ " 12, R. H. .	3725	**3000.00**
*69½	2½ " 12, R. and L...	2525	**2500.00**	*108	2½ " 12, R. and L..	4156	**3335.00**
†69¾	4 I. D. to 15 O. D., R. H.	2647	**3335.00**	....	.....	....	.....

*Pressure feed machines. †Lead screw machines.

Numbers 30 to 37 and 70 to 77 have no cut-off attachment, unless specially ordered.

The prices of hand or power machines include countershaft, ratchet wrench and pipe rest.

PARKER'S VISES

1919 REVISION

PARKER'S ECLIPSE MACHINISTS' VISES

STATIONARY BOTTOM

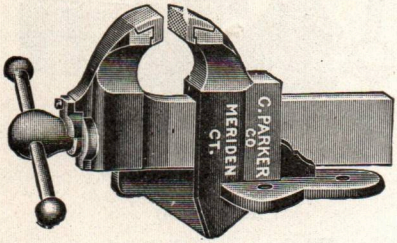


Fig. 30170A

No.	Width Jaws Inches	Jaws Open Inches	Depth Opening Inches	Wt. Lbs.	Price Each
100-2	2	3½	3	13½	**8.25**
101	2½	3½	3	14	**9.00**
102	3	4½	3¼	22	**10.00**
103	3½	5½	3⅝	35	**11.25**
104	4	6½	3¾	43	**12.75**
105	4½	7	4¼	61	**15.50**
106	5	8	4¾	83	**20.00**
106½	5½	9	5⅛	105	**30.00**
107	6	10½	5½	132	**39.00**

SWIVEL BOTTOM

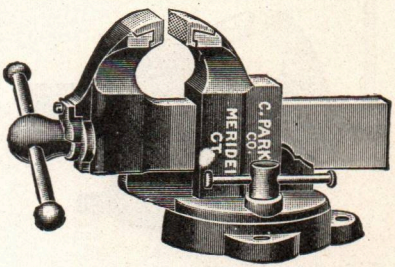


Fig. 30170B

No.	Width Jaws Inches	Jaws Open Inches	Depth Opening Inches	Wt. Lbs.	Price Each
200–2	2	3½	3	16	**10.50**
201	2½	3½	3	16½	**12.00**
202	3	4½	3¼	25	**13.00**
203	3½	5½	3⅝	41	**15.00**
204	4	6½	3¾	57	**17.00**
205	4½	7	4¼	75	**20.00**
206	5	8	4¾	104	**30.00**
206½	5½	9	5⅛	125	**38.00**
207	6	10½	5½	157	**52.00**

PARKER'S SUPERIOR COMBINATION PIPE VISES

SWIVEL BOTTOM

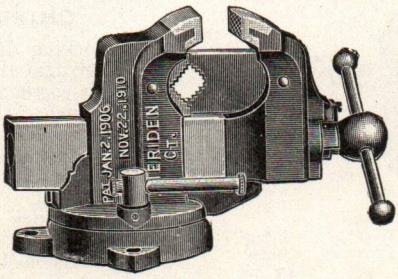


Fig. 30170C

No.	Width of Jaws Inches	Holds Pipe Inches	Weight Pounds	Price Each
87	3⅝	2 & under	47	**16.00**
88	4¼	3 " "	71	**22.00**
288½	5	4 " "	118	**32.00**
289½	6	6 " "	185	**45.00**

No. 289½ locks under the bench.

STARRETT IMPROVED VISES

1919 REVISION

SWIVEL JAW VISES

SWIVEL BASE

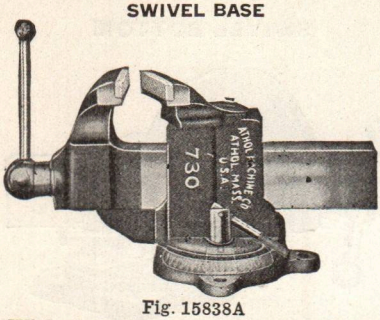


Fig. 15838A

With the ratchet handle, the quick adjusting positive lock, swivel base, and a straight threaded end on the taper pin so that swivel back jaw can be drawn to a proper bearing and the pin may be removed easily when desired.

No.	Width Jaws Inches	Jaws Open Inches	Weight Pounds	Price Each
724	2½	3½	18	**16.25**
726	3	4	23	**17.75**
728	3½	5	36	**20.25**
730	4	6	49	**24.50**
732	4½	7	68	**28.50**
734	5	8	87	**35.50**
736	5½	9	108	**44.75**

STATIONARY BASE

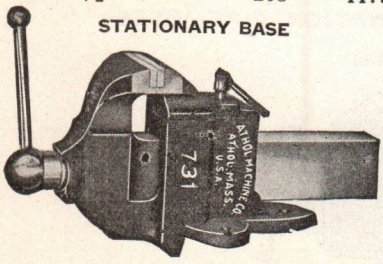


Fig. 15838B

No.	Width Jaws Inches	Jaws Open Inches	Weight Pounds	Price Each
725	2½	3½	17	**13.75**
727	3	4	21	**15.25**
729	3½	5	31	**16.25**
731	4	6	42	**19.50**
733	4½	7	57	**22.50**
735	5	8	74	**28.50**
737	5½	9	93	**38.75**

Above vises will be furnished with check faced tempered steel jaws unless smooth-faced jaws are specified.

No. 600 SWIVEL BASE VISES

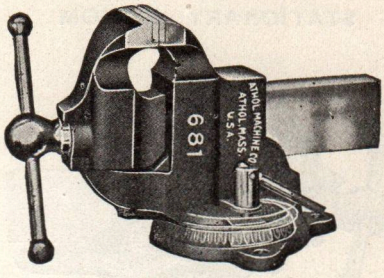


Fig. 15838C

No. 677 has smooth-faced tempered steel jaws.

No. 679, 680, 681 and 682 will be furnished with smooth jaws when so ordered at no extra cost. Nos. 678, 683, 684, 685, 686 and 687 have checked jaws.

No.	Width Jaws Inches	Jaws Open Inches	Weight Pounds	Price Each
677	2⅛	2	7½	**8.00**
678	2½	2¾	11½	**10 00**
679	3	3½	18½	**13.00**
680	3½	4	30½	**15.00**
681	4	5	48	**17.00**
682	4½	6	64½	**20.00**
683	5	7	83½	**30.00**

SWIVEL BASE EXTRA HEAVY CHIPPING VISES

The locking device consists of a bolt with a corrugated head engaging a correspondingly corrugated base that is fastened to the bench. Loosening the lever will allow the bolt head to drop down and release the connection, when the vise can be swivelled to any desired angle and quickly locked.

Simple, quick to operate and most effective.

A positive lock swivel base vise that can be depended upon to stay exactly where it is clamped until the bench gives way, is furnished.

No.	Width Jaws Inches	Jaws Open Inches	Weight Pounds	Price Each
684	5½	9½	116	**38.00**
685	6	10½	155	**52.00**
686	7	12½	200	**70.00**
687	8	12½	275	**98.00**

STARRETT IMPROVED VISES AND ATTACHMENT

1919 REVISION

SWIVEL BASE VISES

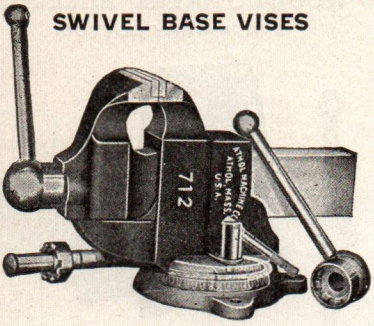


Fig. 15836A

This vise has ratchet handle and quick adjusting positive lock .

No. 704 has smooth-faced, tempered steel jaws. Other numbers are furnished with check jaws, unless smooth-faced jaws are specified.

No.	Width of Jaws Inches	Jaws Open Inches	Weight Pounds	Price Each
704	2⅛	2	7½	**8.25**
706	2½	2¾	11½	**10.25**
708	3	3½	19	**13.25**
710	3½	4	31	**15.00**
712	4	5	49	**17.50**
714	4½	6	66	**21.50**
716	5	7	85	**30.00**
718	5½	9½	112	**38.50**
720	6	10½	155	**53.00**

STATIONARY BASE VISES

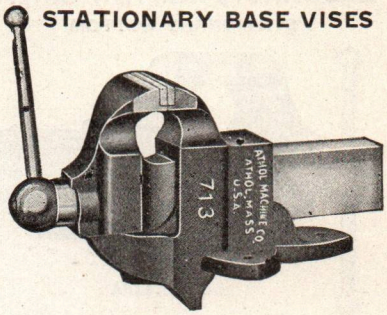


Fig. 15836B

No. 705 has smooth-faced tempered steel jaws. Other numbers are furnished with check jaws unless smooth-faced jaws are specified.

No.	Width of Jaws Inches	Jaws Open Inches	Weight Pounds	Price Each
705	2⅛	2	6	**6 75**
707	2½	2¾	10	**8 25**
709	3	3½	16½	**10.25**
711	3½	4	27	**11.50**
713	4	5	40	**13.25**
715	4½	6	54	**16.50**
717	5	7	68	**22.00**
719	5½	9½	97	**30.00**
721	6	10½	135	**43.00**

No. 192 SINGLE-ADJUSTABLE TAPER ATTACHMENTS

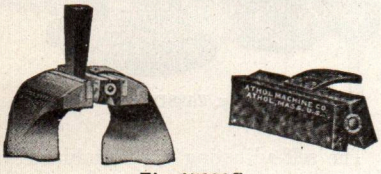


Fig. 15836C

This is a strong simple attachment for holding taper pieces in a vise in a vertical position. Every mechanic recalls the time he has wasted, and the work that has been spoiled through not being able to grip a taper piece firmly. No tool room or tool chest should be without them.

Width Inches	Price Each	Width Inches	Price Each	Width Inches	Price Each
1⅝	**1.00**	2½	**1.50**	3½	**2.10**
2⅛	**1.20**	3	**1.80**	4	**2.40**

No. 193 DOUBLE-ADJUSTABLE TAPER ATTACHMENTS

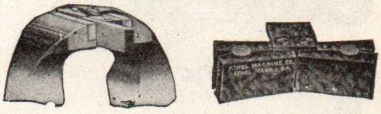


Fig. 15836D

This is for holding short tapers in a horizontal position. Much quicker in action than a swivel-jaw vise, and capable of holding pieces that are too short to be held by the swivel jaw.

Width Inches	Price Each	Width Inches	Price Each	Width Inches	Price Each
1⅝	**1.00**	2½	**1.50**	3½	**2.10**
2⅛	**1.20**	3	**1.80**	4	**2.40**

PRENTISS VISES

1919 REVISION

MACHINISTS' RAPID TRANSIT

STATIONARY BOTTOM

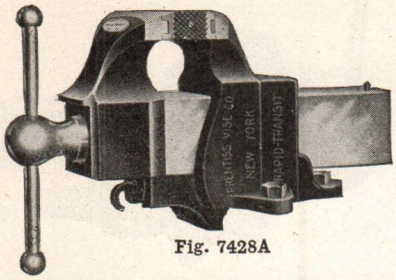


Fig. 7428A

These vises have a very limited number of parts (there being actually but two pieces more than in an ordinary screw vise). By a single movement this vise may be opened or closed full length and the nut will engage the screw at any point.

No.	Width Jaws Inches	Opens Inches	Weight Pounds	Price Each
70	3	3½	22	**12.00**
71	3¾	4½	33	**14.00**
72	4¼	5½	54	**20.00**
73	4¾	6½	65	**24.00**
74	5½	8	98	**34.00**
75	6½	9½	150	**50.00**

WOODWORKERS' VISES

STATIONARY BOTTOM

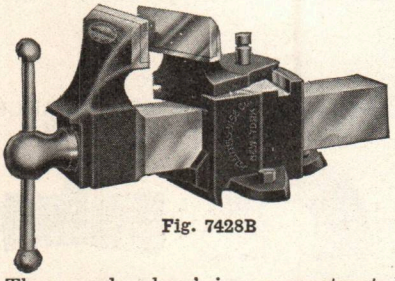


Fig. 7428B

These coachmakers' vises are constructed upon the same principles as the Prentiss Patent Iron Workers' Vises, and possess many advantages for the use of car and carriage builders, furniture manufacturers, pattern makers and all woodworkers.

No.	Width Jaws Inches	Opens Inches	Weight Pounds	Price Each
12	3½	7	30	**19.00**
10	4½	9½	59	**25.00**

WOODWORKERS' BULLDOG

STATIONARY BOTTOM

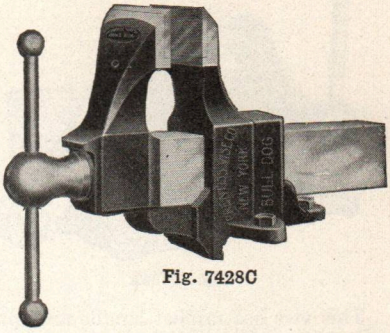


Fig. 7428C

These vises are medium sized and designed for the use of carriage and wagon workers, pattern makers and woodworkers generally.

No.	Width Jaws Inches	Opens Inches	Weight Pounds	Price Each
*59	4¼	9	48	**16.25**
99	4¼	9	58	**21.25**

WOODWORKERS' VISES

SWIVEL BOTTOM

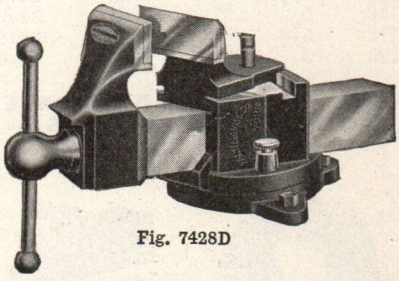


Fig. 7428D

The self-adjusting jaw, combined with the patent swivel bottom, makes the best vise ever offered artisans in wood, the large surfaces of the jaws (which are finished perfectly smooth) protecting the work from injury, while the self-adjusting jaw easily and firmly holds articles of any shape.

No.	Width Jaws Inches	Opens Jaws Inches	Weight Pounds	Price Each
27	3½	7	34	**23.00**
26	4½	9½	67	**30.00**

PRENTISS VISES

EFFECTIVE FEBRUARY 15, 1919

MACHINISTS' SELF-ADJUSTING JAW VISES

STATIONARY BOTTOM

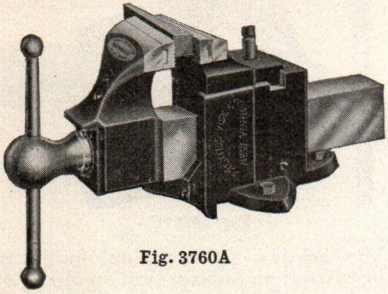


Fig. 3760A

Number....	1	2	2½	3
Width of Jaws in.	2⅝	3½	4	4½
Opens.... "	3½	4¾	5¼	6
Weight..lbs.	13½	28	41	54
Price.....ea.	**13.50**	**16.00**	**19.00**	**22.00**
Number....	4	5	6	.....
Width of Jaws in.	5¼	6	7	.....
Opens.... "	8	9	11	.....
Weight..lbs.	96	146	184	.....
Price.....ea.	**35.00**	**50.00**	**65.00**	.....

SWIVEL BOTTOM

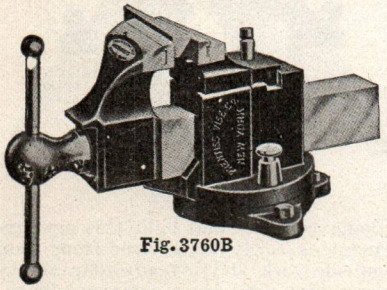


Fig. 3760B

Number....	18	19	19½	20
Width of Jaws in.	2⅝	3½	4	4½
Opens.... "	3½	4¾	5¼	6
Weight..lbs.	17	32	46	65
Price.....ea.	**16.00**	**20.00**	**24.00**	**28.00**
Number....	21	22	23	.....
Width of Jaws in.	5¼	6	7	.....
Opens.... "	8	9	11	.....
Weight..lbs.	109	168	207	.....
Price.....ea.	**44.00**	**60.00**	**75.00**	.....

MACHINISTS' SOLID JAW BULLDOG VISES

STATIONARY BOTTOM

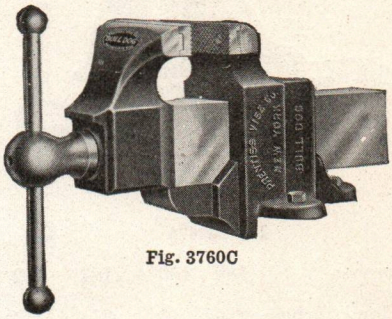


Fig. 3760C

Number....	50	51	52	53
Width of Jaws in.	3¼	3⅝	4⅛	4⅝
Opens.... "	4	5½	6	7
Weight...lbs.	22	28	42	52
Price.....ea.	**10.00**	**11.25**	**12.75**	**15.50**
Number....	54	55	56	57
Width of Jaws in.	5	5½	6	7
Opens.... "	8	9	10	12
Weight..lbs.	72	100	135	210
Price.....ea.	**20.00**	**30.00**	**39.00**	**55.00**

SWIVEL BOTTOM

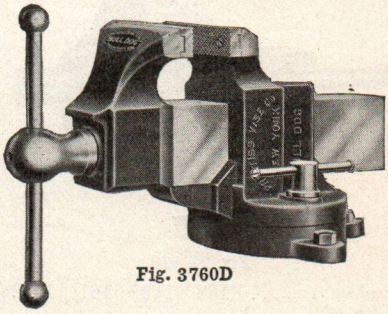


Fig. 3760D

Number....	90	91	92	93
Width of Jaws in.	3¼	3⅝	4⅛	4⅝
Opens.... "	4	5½	6	7
Weight..lbs.	28	36	52	64
Price.....ea.	**13.00**	**15.00**	**17.00**	**20.00**
Number....	94	95	96	97
Width of Jaws in.	5	5½	6	7
Opens.... "	8	9	10	12
Weight..lbs.	85	115	155	235
Price.....ea.	**30.00**	**38.00**	**52.00**	**70.00**

PRENTISS VISES

EFFECTIVE APRIL, 1919

BLAKE COMBINATION

SWIVEL BOTTOM

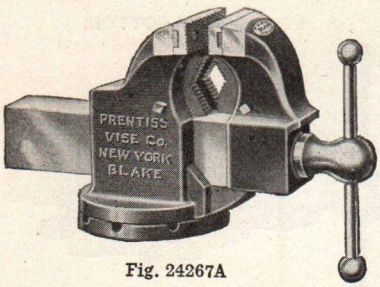


Fig. 24267A

Number.....	180	180½	181	182
Width of Jaws. inches	2½	3	3½	4¼
Holds Pipe "	⅛ to 1	⅛ to 1½	⅛ to 2½	⅛ to 3
Weight....lbs.	15	22	55	80
Price....each	**10.00**	**12.00**	**16.00**	**22.00**
Number.....	182½	183	185	...
Width of Jaws. inches	5	6	7	.....
Holds Pipe "	⅛ to 4	⅛ to 6	⅛ to 8	.....
Weight...lbs.	120	185	240	.....
Price....each	**32.00**	**45.00**	**60.00**	.....

SHEPARD NEW STATIONARY

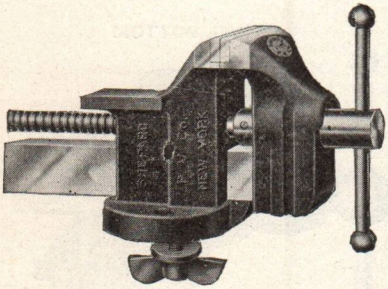


Fig. 24267B

Number.....	158	160	161	161½
Width of Jaws...inches	2	2	2½	3
Holds Pipe "	2	2	3	3½
Weight.....lbs.	2½	4	10	12
Price.....each	**1.65**	**3.00**	**3.75**	**4.75**
Number.....	162	163	164	....
Width of Jaws...inches	3½	4	4½	....
Holds Pipe "	4	6	7½	....
Weight.....lbs.	16	30	44	....
Price.....each	**5.25**	**8.25**	**12.00**	....

DETAIL VIEW PRENTISS VISE

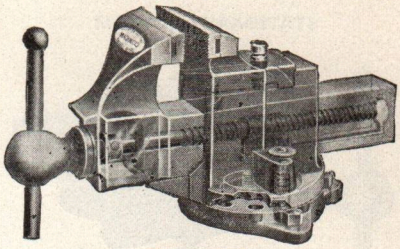


Fig. 24267C

The back jaw of this vise automatically adjusts itself and makes firm an object of any shape. With back jaw pin inserted, it becomes a parallel solid jaw vise. The self-adjusting jaw, resting and working as it does upon and against the solid body of the vise, is thereby rendered as strong and durable as a solid jaw.

The patent swivel bottom enables operator to instantly adjust vise right or left at will, by means of ratchet pin on side of vise.

NEW PEERLESS PATENT PIPE GRIP

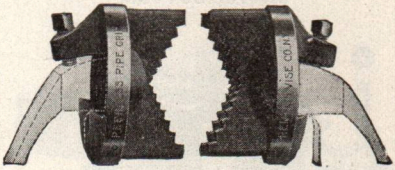


Fig. 24267D

Being compact and light, this new implement is easily transferred from shop to outside work, and its ready adaptability to any vise used by machinists, blacksmiths, etc., makes it particularly acceptable in mining, oil or other sections remote from machine shops where it is invaluable and indeed almost indispensable.

No.	Fits Vise with Jaws, Inches	Hold Pipe Inches	Price Each
1	3 to 4½	¼ to 2½	**3.50**
2	4¾ " 5½	¼ " 5	**3.75**
3	6 " 8½	¼ " 6	**4.00**

COLUMBIAN VISES

SOLID BOX LEG VISE

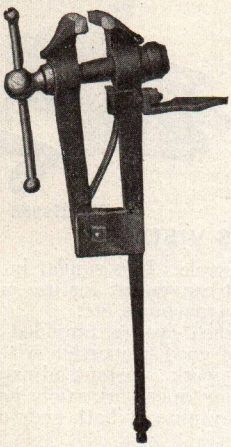


Fig. 21855A

SWIVEL LEG VISE

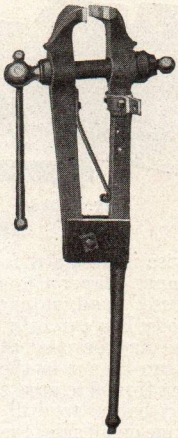


Fig. 21855B

SOLID BOX LEG VISES

The jaws of this vise are also solid forgings. The bench plate has been remodeled to increase its strength and rigidity. The U bolt holds the spring securely in place and eliminates the possibility of any parts becoming loose.

The open end of the cut-off box allows chips and dust to liberate themselves instead of accumulating in the end of the box.

No.	Approx. Weight Pounds	Length of Jaw Inches	Price Each	No.	Approx. Weight Pounds	Length of Jaw Inches	Price Each
25	25	3¼	**12.00**	80	80	5¼	**17.50**
30	30	3⅜	**11.00**	90	90	5½	**20.00**
35	35	4	**10.00**	100	100	6	**22.00**
40	40	4	**10.50**	115	115	6¼	**25.00**
45	45	4¼	**11.00**	125	125	6½	**27.50**
50	50	4¼	**11.50**	150	150	7	**36.00**
60	60	4½	**13.00**	180	180	7½	**47.00**
70	70	5	**15.00**	200	200	8	**56.00**

SWIVEL LEG VISES

The bench plate for this vise is made in two styles, both of which allow the vise to swivel. One model of the bench plate is designed for fastening on the vertical edge of the bench, and the other style can be applied to the horizontal surface. Each jaw is a solid forging with neither welded head nor leg.

No.	Weight Pounds	Length of Jaw Inches	Price Each	No.	Weight Pounds	Length of Jaw Inches	Price Each
5050	50	4¼	**11.50**	5070	70	5	**15.00**
5060	60	4½	**13.00**	5080	80	5¼	**17.50**

DRILL PRESS VISES

SKINNER DRILL PRESS VISE

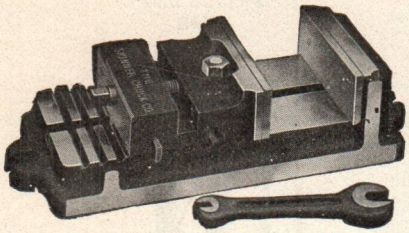


Fig. 27998A

GRAHAM DRILL PRESS VISE

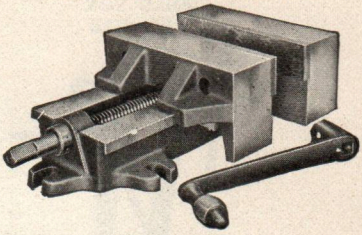


Fig. 27998B

SKINNER DRILL PRESS VISES

This vise is designed for holding work on a drill table. It is similar in construction to the Skinner Planer Chuck, but more portable and convenient for use on a drill. It can also be used to advantage on planers, shapers, milling machines, etc.

The body is a carefully machined and highly finished casting, provided with lugs on side so vise may be used at right angles. Jaws are of good proportion with steel faces. V grooves can be cut in these jaws for holding round work. Instant adjustment can be made of jaws from 0 to greatest capacity; either straight or taper work can be held.

Fittings bolted to drill, planer, miller or shaper by nuts at both ends of vise. Vise also has flange on all sides for clamping.

Size Inches	Width of Jaws Inches	Depth of Jaws Inches	Jaws Will Open Inches	Space Required Inches	Weight Pounds	Price Each
2½	2½	1	2½	6 x2½	4¼	**10.00**
3½	3½	1⅜	4¾	9⅝x4⅛	12	**12.00**
4½	4½	2	5	14 x5¼	37	**15.00**
5½	5½	2	6	15 x6	43	**18.00**
7½	7½	2½	9	19¾x9	98	**30.00**

GRAHAM DRILL PRESS VISES

This vise can be furnished either with jig attachments or as a plain vise. The illustration shows the vise stripped of its jig features, and as ordinarily used for shop work, on drill press, planer, shaper or miller. The patterns and dimensions are the same as those of the universal jig vise.

No.	Length of Jaws Inches	Depth of Jaws Inches	Jaws Will Open Inches	With Jig Attachment Weight Pounds	With Jig Attachment Price Each	Without Jig Attachment Weight Pounds	Without Jig Attachment Price Each
3	6	1½	4½	36	**22.00**	30	**20.00**
4	9	2	7	70	**27.50**	60	**25.00**
5	12	2½	9½	138	**40.00**	122	**36.00**

V-jaws are extra — M. S. drilled, tapped and casehardened. No. 3, 2.50, No. 4, 3.50; No. 5, 5.00. Shell jaws are extra — No. 3, 1.00; No. 4, 1.50; No. 5, 2.00.

Bushings, holes up to 1 1/16-inch (length, 1 1/16x1 3/16-inch diameter), each, 60 cents.

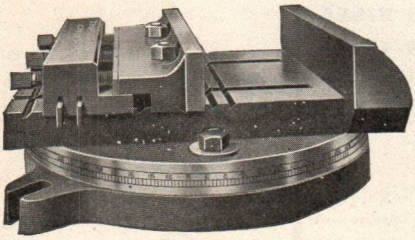


Fig. 27998C

SKINNER PLANER CHUCKS

No.	Length of Jaw Inches	Depth of Jaw Inches	Jaws Will Open Inches	Approx. Weight Pounds	Price Each
6R	7	1½	3½	77	**32.00**
8R	9	1⅞	5	95	**38.00**
10R	11	2⅜	6	165	**45.00**
12R	13	2⅜	8	220	**54.00**
15R	15½	2½	9½	310	**70.00**
18R	18½	2¾	11¼	442	**90.00**
24R	24¼	2¾	16	722	**130.00**
30R	30¼	3	21½	1200	**200.00**

PIPE VISES

ARMSTRONG HINGED PIPE VISE
OPEN

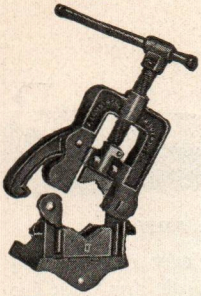


Fig. 6794A

CLOSED

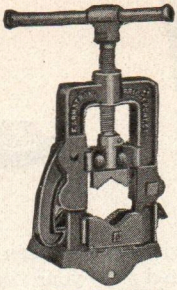


Fig. 6794B

ARMSTRONG VISE
WITH JAWS
FOR BRASS PIPE

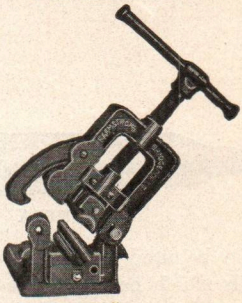


Fig. 6794C

ARMSTRONG HINGED PIPE VISES

Number	0	1	2	2
Holds Pipe ..... inches	1/8 to 2 1/2	1/8 to 2 1/2	1/2 to 4 1/2	1 to 6
Price, with Steel Jaws ..... each	5.00	6.00	12.50	23.50

ARMSTRONG BRASS PIPE JAWS—FOR No. 1 VISE

For O. D. Brass Tubing .. inches	5/8, 3/4 or 7/8	1, 1 1/8 or 1 1/4	1 3/8, 1 1/2 or 1 5/8	1 3/4, 1 7/8 or 2	2 1/8, 2 1/4 or 2 3/8
For I. P. Size Brass Tubing ..... inches	1/8, 1/4 or 3/8	.....	1/2, 3/4 or 1	.....	1 1/4, 1 1/2 or 2
Price ..... each	.75	1.00	1.25	1.50	1.75

VULCAN DROP-FORGED CHAIN PIPE VISES

No. 1

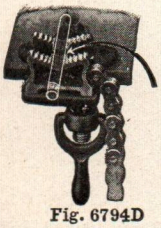


Fig. 6794D

No. 2

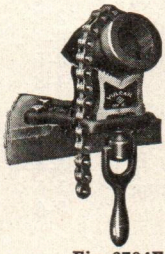


Fig. 6794E

No. 4

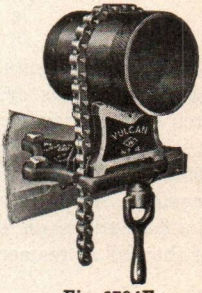


Fig. 6794F

Number	1	2	4
Capacity, Pipe ..... inches	1/8 to 2	1/4 to 4	3/4 to 8
Approximate Weight ..... pounds	4	10	30
" Size, Folded ..... inches	4x5x6	6x8x8	8x10x12
Price, Complete ..... each	3.50	7.50	18.00
" Extra Jaws ..... per pair	1.50	3.50	9.00
" " Chains with Screws ..... each	1.25	2.40	6.00
" " Screws ..... "	.40	.70	1.25
" " Handles and Nuts ..... "	1.10	2.10	3.50
" " Nuts ..... "	.70	1.35	2.00

USE-EM-UP DRILL SOCKETS

SLEEVE TYPE

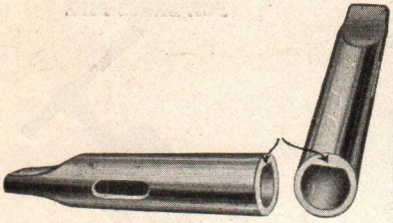


Fig. 5912A

To be used in connection with twist drills which have had the tangs twisted off. All that is necessary is to grind a flat on the remaining portion of the shank (time 3 minutes.)

Size No.	Number of Hole	Fitted to Socket Number	Price Each
1–2	1	2	**1.80**
1–3	1	3	**2.40**
1–4	1	4	**3.00**
1–5	1	5	**4.40**
2–3	2	3	**2.40**
2–4	2	4	**3.00**
2–5	2	5	**4.40**
3–4	3	4	**3.00**
3–5	3	5	**4.40**
4–5	4	5	**4.40**
4–6	4	6	**10.00**
5–6	5	6	**10.00**

Use-Em-Up Drill Sockets are intended for using up twist drills or reamers having broken shanks or twisted tangs.

These sockets will drive a drill where only three-quarters of an inch of the shank remains. All that is necessary is to grind a flat surface on the remaining shank of the drill or reamer and put it to work.

When making boring bars, the expense of milling a tang is unnecessary; simply flat one side and use the Use-Em-Up Socket.

A man actually bought 43 good twist drills for 25 cents.

He stood in the yard of one of the plants of a large brake shoe company watching them unload a car of scrap from an eastern railroad.

SOCKET TYPE

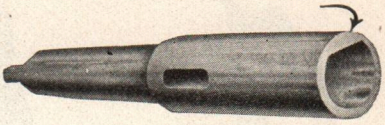


Fig. 5912B

When ordering new drills, specify on your order, Flatted for Use-Em-Up Sockets, and you will not have any trouble with twisted tangs. All leading drill manufacturers will flat their drills at no extra charge.

Size No.	Number of Hole	Fitted to Socket Number	Price Each
1–2	1	2	**2.00**
1–3	1	3	**2.50**
1–4	1	4	**3.20**
1–5	1	5	**4.80**
2–3	2	3	**2.50**
2–4	2	4	**3.20**
2–5	2	5	**4.80**
3–2	3	2	**3.20**
3–3	3	3	**3.20**
3–4	3	4	**3.20**
3–5	3	5	**4.80**
4–3	4	3	**4.80**
4–4	4	4	**4.80**
4–5	4	5	**4.80**
4–6	4	6	**12.00**
5–4	5	4	**12.00**
5–5	5	5	**12.00**
5–6	5	6	**12.00**

He picked out 43 good twist drills, gave the superintendent a quarter and took them away. True, the tangs were twisted off, and on some the shank was broken so that there was only three-quarters of an inch of shank left, but it was only necessary to grind a flat on them (time, two minutes per drill) and put them in the Use-Em-Up Drill Socket to make them as good as ever.

CLEVELAND SOCKETS

PERFECT DOUBLE TANG SOCKETS

No. 81 SLEEVE

Fig. 8308A

No. 82 FITTED

Fig. 8308B

No. 81 SLEEVE SOCKETS

Size	Number of Hole	Number of Socket Fits	Price Each	Size	Number of Hole	Number of Socket Fits	Price Each
1 to 2	1	2	1.80	2 to 5	2	5	4.40
1 " 3	1	3	2.40	3 " 4	3	4	3.00
1 " 4	1	4	3.00	3 " 5	3	5	4.40
1 " 5	1	5	4.40	4 " 5	4	5	4.40
2 " 3	2	3	2.40	4 " 6	4	6	10.00
2 " 4	2	4	3.00	5 " 6	5	6	10.00

No. 82 FITTED SOCKETS

1 to 2	1	2	2.00	3 to 4	3	4	3.20
1 " 3	1	3	2.50	3 " 5	3	5	4.80
1 " 4	1	4	3.20	4 " 3	4	3	4.80
1 " 5	1	5	4.80	4 " 4	4	4	4.80
2 " 2	2	2	2.50	4 " 5	4	5	4.80
2 " 3	2	3	2.50	4 " 6	4	6	12.00
2 " 4	2	4	3.20	5 " 4	5	4	12.00
2 " 5	2	5	4.80	5 " 5	5	5	12.00
3 " 2	3	2	3.20	5 " 6	5	6	12.00
3 " 3	3	3	3.20	.....	.....	.....	.....

PARAGON SOCKETS

No. 907 SLEEVE

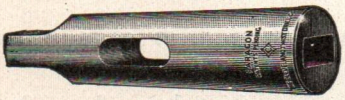


Fig. 8308C

No. 903 FITTED

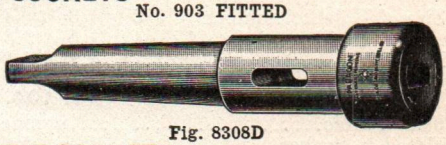


Fig. 8308D

No. 907 SLEEVE SOCKETS

Size	Number of Hole	Number of Socket Fits	Price Each	Size	Number of Hole	Number of Socket Fits	Price Each
1 to 2	1	2	1.80	2 to 5	2	5	4.40
1 " 3	1	3	2.40	3 " 3	3	3	3.00
1 " 4	1	4	3.00	3 " 4	3	4	3.00
1 " 5	1	5	4.40	3 " 5	3	5	4.40
2 " 2	2	2	2.40	4 " 4	4	4	4.40
2 " 3	2	3	2.40	4 " 5	4	5	4.40
2 " 4	2	4	3.00	4 " 6	4	6	10.00

No. 903 FITTED SOCKETS

1 to 1	1	1	2.00	3 to 2	3	2	3.20
1 " 2	1	2	2.00	3 " 3	3	3	3.20
1 " 3	1	3	2.50	3 " 4	3	4	3.20
1 " 4	1	4	3.20	3 " 5	3	5	4.80
1 " 5	1	5	4.80	4 " 2	4	2	4.80
2 " 2	2	2	2.50	4 " 3	4	3	4.80
2 " 3	2	3	2.50	4 " 4	4	4	4.80
2 " 4	2	4	3.20	4 " 5	4	5	4.80
2 " 5	2	5	4.80	4 " 6	4	6	12.00

CLEVELAND SOCKETS AND KEYS

SOCKETS FOR TAPER SHANK DRILLS

No. 100, ROUGH

Fig. 3207A

Number	1	2	3	4	5	6
Size of Holes.....inches	1/4 to 9/16	19/32 to 29/32	15/16 to 1 1/4	1 5/32 to 2	2 1/16 to 3	3 1/16 to 4
Length Over All.... "	7 1/2	8	10	12 1/2	16	19
Diameter of Shank. "	1 1/8	1 1/4	1 1/2	2	2 3/4	3 3/4
Price.....each	**1.20**	**1.80**	**2.50**	**4.00**	**7.50**	**14.00**

No. 102, FITTED

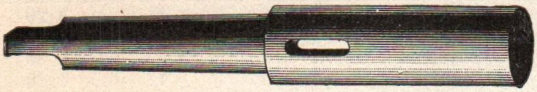


Fig. 3207B

No. 104, SLEEVE

Fig. 3207C

No. 102, FITTED

Size of Hole....number	1	1	1	1	2	2	2	3	3
" " Shank... "	2	3	4	5	3	4	5	2	3
Price.....each	**2.00**	**2.50**	**3.20**	**4.80**	**2.50**	**3.20**	**4.80**	**3.20**	**3.20**
Size of Hole....number	3	3	4	4	4	4	5	5	5
" " Shank... "	4	5	3	4	5	6	4	5	6
Price.....each	**3.20**	**4.80**	**4.80**	**4.80**	**4.80**	**12.00**	**12.00**	**12.00**	**12.00**

No. 104, SLEEVE

Size of Hole.....number	1	1	1	1	2	2
Fitted to Socket..... "	2	3	4	5	3	4
Price.....each	**1.80**	**2.40**	**3.00**	**4.40**	**2.40**	**3.00**
Size of Hole.....number	2	3	3	4	4	5
Fitted to Socket..... "	5	4	5	5	6	6
Price.....each	**4.40**	**3.00**	**4.40**	**4.40**	**10.00**	**10.00**

DRIFTS OR CENTER KEYS

No. 105

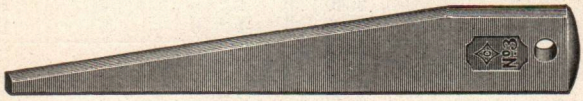


Fig. 3207D

Size No.	Description	Price Each
1	Fitting No. 1 Sockets and Sleeves	.30
2	" " 2 " " "	.35
3	" " 3 " " "	.40
4	" Nos. 4, 5 and 6 Sockets and Sleeves	.50

DRILL LIST

FOR TAPS WITH U. S. STANDARD THREADS

Size of Tap Inches	Threads per Inch	Size of Drill	Size of Tap Inches	Threads per Inch	Size of Drill	Size of Tap Inches	Threads per Inch	Size of Drill
1/4	20	3/16	7/8	9	47/64	1 7/8	5	1 5/8
5/16	18	C	1	8	27/32	2	4 1/2	1 23/32
3/8	16	N	1 1/8	7	61/64	2 1/8	4 1/2	1 27/32
7/16	14	S	1 1/4	7	1 5/64	2 1/4	4 1/2	1 31/32
1/2	13	13/32	1 3/8	6	1 11/64	2 3/8	4	2 1/16
9/16	12	29/64	1 1/2	6	1 19/64	2 1/2	4	2 3/16
5/8	11	33/64	1 5/8	5 1/2	1 25/64	.....	.....	.....
3/4	10	5/8	1 3/4	5	1 1/2	.....	.....	.....

FOR MACHINE SCREW TAPS

Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole	Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole	Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole
2 x 48	44	50	9 x 24	16	30	16 x 16	I	12
2 x 56		49	9 x 28		28	16 x 18		8
2 x 64		48	9 x 30		28	16 x 20		7
			9 x 32		26	17 x 16	L	8
3 x 40	39	49	10 x 24	11	26	17 x 18		4
3 x 48		47	10 x 30		24	17 x 20		3
3 x 56		45	10 x 32		24	18 x 16	19/64	2
4 x 32	33	46	11 x 24	6	21	18 x 18		2
4 x 36		44	11 x 28		20	18 x 20		1
4 x 40		43	11 x 30		19	19 x 16	5/16	1
5 x 30	1/8	43	12 x 20	7/32	24	19 x 18		B
5 x 32		42	12 x 22		20	19 x 20		C
5 x 36		41	12 x 24		19	20 x 16	P	C
5 x 40		38	12 x 28		18	20 x 18		E
6 x 30	28	38	13 x 20	15/64	17	20 x 20		F
6 x 32		37	13 x 22		17	22 x 16	S	H
6 x 36		36	13 x 24		15	22 x 18		J
6 x 40		35				24 x 14	3/8	I
			14 x 20	1/4	15	24 x 16		M
7 x 28	24	34	14 x 22		11	24 x 18		N
7 x 30		33	14 x 24		10	26 x 14	13/32	O
7 x 32		32				26 x 16		P
			15 x 18	F	12	28 x 14	7/16	R
8 x 24	19	31	15 x 20		10	28 x 16		S
8 x 30		31	15 x 22		8	30 x 14	29/64	U
8 x 32		30	15 x 24		7	30 x 16		V

CLEVELAND TAPER SHANK TWIST DRILLS

No. 106, CARBON STEEL **No. 403, HIGH SPEED STEEL**

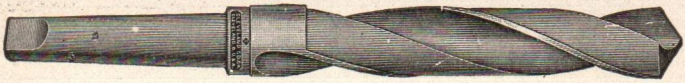


Fig. 3474A

EFFECTIVE JULY 1, 1917

Diam. Inches	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Diam. Inches	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Diam. Inches	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
1/16	4 3/8	.45	.90	39/64	8 3/4	1.60	2.50	1 5/32	11 7/8	4.75	8.90
5/64	4 1/2	.45	.90	5/8	8 3/4	1.60	2.50	1 11/64	12	5.00	9.50
3/32	4 1/2	.45	.90	41/64	9	1.70	2.75	1 3/16	12	5.00	9.50
7/64	4 5/8	.45	.90	21/32	9	1.70	2.75	1 13/64	12 1/8	5.25	10.15
1/8	5 1/8	.45	.90	43/64	9 1/4	1.80	3.00	1 7/32	12 1/8	5.25	10.15
9/64	5 1/4	.45	.90	11/16	9 1/4	1.80	3.00	1 15/64	12 1/2	5.50	10.75
5/32	5 3/8	.45	.90	45/64	9 1/2	1.90	3.25	1 1/4	12 1/2	5.50	10.75
11/64	5 3/4	.50	.90	23/32	9 1/2	1.90	3.25	1 17/64	14 1/8	5.75	11.50
3/16	5 3/4	.50	.90	47/64	9 3/4	2.00	3.50	1 9/32	14 1/8	5.75	11.50
13/64	5 7/8	.55	1.00	3/4	9 3/4	2.00	3.50	1 19/64	14 1/4	6.00	12.25
7/32	5 7/8	.55	1.00	49/64	9 7/8	2 10	3.75	1 5/16	14 1/4	6.00	12.25
15/64	6 1/8	.60	1.10	25/32	9 7/8	2.10	3.75	1 21/64	14 3/8	6.25	13.00
1/4	6 1/8	.60	1.10	51/64	10	2.20	4.00	1 11/32	14 3/8	6.25	13.00
17/64	6 1/4	.65	1.20	13/16	10	2.20	4.00	1 23/64	14 1/2	6.50	13.75
9/32	6 1/4	.65	1.20	53/64	10 1/4	2.40	4.40	1 3/8	14 1/2	6.50	13.75
19/64	6 3/8	.70	1.30	27/32	10 1/4	2.40	4.40	1 25/64	14 5/8	7.00	14.65
5/16	6 3/8	.70	1.30	55/64	10 1/2	2.60	4.75	1 13/32	14 5/8	7.00	14.65
21/64	6 1/2	.75	1.40	7/8	10 1/2	2.60	4.75	1 27/64	14 3/4	7.50	15.50
11/32	6 1/2	.75	1.40	57/64	10 5/8	2.80	5.15	1 7/16	14 3/4	7.50	15.50
23/64	6 3/4	.80	1.50	29/32	10 5/8	2.80	5.15	1 29/64	14 7/8	8.00	16.40
3/8	6 3/4	.80	1.50	59/64	10 3/4	3.00	5.50	1 15/32	14 7/8	8.00	16.40
25/64	7	.90	1.65	15/16	10 3/4	3.00	5.50	1 31/64	15	8.50	17.25
13/32	7	.90	1.65	61/64	10 7/8	3.25	5.90	1 1/2	15	8.50	17.25
27/64	7 1/4	1.00	1.75	31/32	10 7/8	3.25	5.90	1 33/64	15 1/8	9.00	18.15
7/16	7 1/4	1.00	1.75	63/64	11	3.50	6.25	1 17/32	15 1/8	9.00	18.15
29/64	7 1/2	1.10	1.90	1	11	3.50	6.25	1 35/64	15 1/4	9.50	19.00
15/32	7 1/2	1.10	1.90	1 1/64	11 1/8	3.75	6.75	1 9/16	15 1/4	9.50	19.00
31/64	7 3/4	1.20	2.00	1 1/32	11 1/8	3.75	6.75	1 37/64	15 3/8	10.00	20.00
1/2	7 3/4	1.20	2.00	1 3/64	11 1/4	4.00	7.25	1 19/32	15 3/8	10.00	20.00
33/64	8	1.30	2.15	1 1/16	11 1/4	4.00	7.25	1 39/64	15 1/2	10.50	21.00
17/32	8	1.30	2.15	1 5/64	11 1/2	4.25	7.75	1 5/8	15 1/2	10.50	21.00
35/64	8 1/4	1.40	2.25	1 3/32	11 1/2	4.25	7.75	1 41/64	15 5/8	11.00	22.00
9/16	8 1/4	1.40	2.25	1 7/64	11 3/4	4.50	8.25	1 21/32	15 5/8	11.00	22.00
37/64	8 1/2	1.50	2.40	1 1/8	11 3/4	4.50	8.25	1 43/64	15 3/4	11.50	23.00
19/32	8 1/2	1.50	2.40	1 9/64	11 7/8	4.75	8.90	1 11/16	15 3/4	11.50	23.00

Discount on carbon steel drills changes at 1½-inch.

ABOVE DRILLS HAVE TAPER SHANKS AS FOLLOWS

Taper Shank.....number	1	2	3	4
Diameters (inclusive).....inches	1/16 to 9/16	37/64 to 29/32	59/64 to 1 1/4	1 17/64 to 1 11/16

Millimeters sizes can be furnished on special order.

CLEVELAND TAPER SHANK TWIST DRILLS

No. 106, CARBON STEEL **No. 403, HIGH SPEED STEEL**

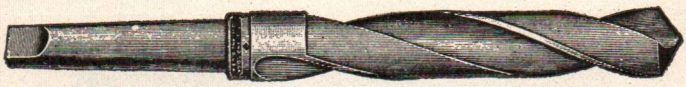


Fig. 3473A

EFFECTIVE JULY 1, 1917

Diam. Inches	Length Over All Inches	Price, Each		Diam. Inches	Length Over All Inches	Price, Each		Diam. Inches	Length Over All Inches	Price, Each	
		Carbon Steel	High Speed Steel			Carbon Steel	High Speed Steel			Carbon Steel	High Speed Steel
1 5/64	15 7/8	12.00	24.00	2 15/64	17 1/2	24.50	45.00	2 19/64	20 1/2	39.25	87.50
1 23/32	15 7/8	12.00	24.00	2 1/4	17 1/2	24.50	45.00	2 25/32	20 1/2	39.25	87.50
1 47/64	16	12.50	25.00	2 17/64	17 1/2	25.25	47.50	2 51/64	20 1/2	40.50	90.00
1 3/4	16	12.50	25.00	2 9/32	17 1/2	25.25	47.50	2 13/16	20 1/2	40.50	90.00
1 49/64	16 1/8	13.25	26.25	2 19/64	17 1/2	26.00	50.00	2 53/64	21	41.75	92.50
1 25/32	16 1/8	13.25	26.25	2 5/16	17 1/2	26.00	50.00	2 27/32	21	41.75	92.50
1 51/64	16 1/4	14.00	27.50	2 21/64	18	26.75	52.50	2 55/64	21	43.00	95.00
1 13/16	16 1/4	14.00	27.50	2 11/32	18	26.75	52.50	2 7/8	21	43.00	95.00
1 53/64	16 3/8	14.75	28.75	2 23/64	18	27.50	55.00	2 57/64	21	44.25	97.50
1 27/32	16 3/8	14.75	28.75	2 3/8	18	27.50	55.00	2 29/32	21	44.25	97.50
1 55/64	16 1/2	15.50	30.00	2 25/64	18 1/2	28.25	57.50	2 59/64	21	45.50	100.00
1 7/8	16 1/2	15.50	30.00	2 13/32	18 1/2	28.25	57.50	2 15/16	21	45.50	100.00
1 57/64	16 1/2	16.25	31.25	2 27/64	18 1/2	29.00	60.00	2 61/64	22	46.75	102.50
1 29/32	16 1/2	16.25	31.25	2 7/16	18 1/2	29.00	60.00	31/32	22	46.75	102.50
1 59/64	16 1/2	17.00	32.50	2 29/64	19	29.75	62.50	2 63/64	22	48.00	105.00
1 15/16	16 1/2	17.00	32.50	2 15/32	19	29.75	62.50	3	22	48.00	105.00
1 61/64	16 1/2	17.75	33.75	2 31/64	19	30.50	65.00	3 1/16	22	52.00	112.50
1 31/32	16 1/2	17.75	33.75	2 1/2	19	30.50	65.00	3 1/8	22	56.00	120.00
1 63/64	16 1/2	18.50	35.00	2 33/64	19 1/4	31.25	67.50	3 3/16	22	60.00	127.50
2	16 1/2	18.50	35.00	2 17/32	19 1/4	31.25	67.50	3 1/4	23	65.00	135.00
2 1/64	16 1/2	19.25	36.25	2 35/64	19 1/4	32.00	70.00	3 5/16	23	70.00	142.50
2 1/32	16 1/2	19.25	36.25	2 9/16	19 1/4	32.00	70.00	3 3/8	23	75.00	150.00
2 3/64	17	20.00	37.50	2 37/64	19 1/2	33.00	72.50	3 7/16	23	80.00	157.50
2 1/16	17	20.00	37.50	2 19/32	19 1/2	33.00	72.50	3 1/2	24	85.00	165.00
2 5/64	17	20.75	38.75	2 39/64	19 1/2	34.00	75.00	3 9/16	24	91.00	172.50
2 3/32	17	20.75	38.75	2 5/8	19 1/2	34.00	75.00	3 5/8	24	98.00	180.00
2 7/64	17	21.50	40.00	2 41/64	20	35.00	77.50	3 11/16	24	105.00	187.50
2 1/8	17	21.50	40.00	2 21/32	20	35.00	77.50	3 3/4	24	112.00	195.00
2 9/64	17	22.25	41.25	2 43/64	20	36.00	80.00	3 13/16	24	119.00	202.50
2 5/32	17	22.25	41.25	2 11/16	20	36.00	80.00	3 7/8	24	126.00	210.00
2 11/64	17	23.00	42.50	2 45/64	20 1/2	37.00	82.50	3 15/16	24	133.00	217.50
2 3/16	17	23.00	42.50	2 23/32	20 1/2	37.00	82.50	4	25	140.00	225.00
2 13/64	17 1/2	23.75	43.75	2 47/64	20 1/2	38.00	85.00	.....	.....	.....	.....
2 7/32	17 1/2	23.75	43.75	2 3/4	20 1/2	38.00	85.00	.....	.....	.....	.....

Discount on carbon steel drills changes at 1½-inch.

ABOVE DRILLS HAVE TAPER SHANKS AS FOLLOWS

Taper Shank.....number	4	5	6
Diameters (inclusive).....inches	1 45/64 to 2	2 1/64 to 3	3 1/16 to 4

Millimeter sizes can be furnished on special order.

CLEVELAND STRAIGHT SHANK DRILLS

SHORT SET

No. 108, CARBON STEEL **No. 417, HIGH SPEED STEEL**

Fig. 24506A

EFFECTIVE JULY 1, 1917

Diam. Inches	Length Over All Inches	Price, per Dozen Carbon Steel	Price, per Dozen High Speed Steel	Diam. Inches	Length Over All Inches	Price, per Dozen Carbon Steel	Price, per Dozen High Speed Steel
1/32	1½	1.50	....	9/32	4¼	3.80	9.10
3/64	1¾	1.55	....	19/64	4⅜	4.00	10.50
1/16	2½	1.60	5.70	5/16	4½	4.35	10.50
5/64	2⅝	1.65	5.70	21/64	4⅝	4.70	12.00
3/32	2¾	1.70	5.70	11/32	4¾	5.05	12.00
7/64	2⅞	1.75	5.90	23/64	4⅞	5.50	13.50
1/8	3	1.80	5.90	3/8	5	6.00	13.50
9/64	3⅛	1.85	6.10	25/64	5⅛	6.50	15.00
5/32	3¼	1.90	6.10	13/32	5¼	7.00	15.00
11/64	3⅜	2.00	6.30	27/64	5⅜	7.75	17.00
3/16	3½	2.25	6.30	7/16	5½	8.50	17.00
13/64	3⅝	2.50	7.00	29/64	5⅝	9.25	18.75
7/32	3¾	2.75	7.00	15/32	5¾	10.00	18.75
15/64	3⅞	3.00	7.35	31/64	5⅞	11.00	20.00
1/4	4	3.25	7.35	1/2	6	12.00	20.00
17/64	4⅛	3.50	9.10	.	.	.....	.....

No. 109, CARBON STEEL **No. 419, HIGH SPEED STEEL**

Fig. 24506B

Diam.	Decimal Diam. Inches	Length Over All Inches	Price, per Dozen Carbon Steel	Price, per Dozen High Speed Steel	Diam.	Decimal Diam. Inches	Length Over All Inches	Price, per Dozen Carbon Steel	Price, per Dozen High Speed Steel
A	.234	3 13/16	3.00	7.35	N	.302	4¼	4.25	10.50
B	.238	3 13/16	3.05	7.35	O	.316	4¼	4.40	10.50
C	.242	3 13/16	3.10	7.35	P	.323	4⅝	4.60	12.00
D	.246	3 13/16	3.15	7.35	Q	.332	4¾	4.75	12.00
E	.250	3 13/16	3.25	7.35	R	.339	4¾	5.00	12.00
F	.257	4¼	3.35	9.10	S	.348	4⅞	5.15	13.50
G	.261	4¼	3.45	9.10	T	.358	4⅞	5.30	13.50
H	.266	4¼	3.55	9.10	U	.368	5	5.50	13.50
I	.272	4¼	3.65	9.10	V	.377	5	6.00	13.50
J	.277	4¼	3.70	9.10	W	.386	5⅛	6.50	15.00
K	.281	4¼	3.80	9.10	X	.397	5¼	6.75	15.00
L	.290	4¼	3.90	10.50	Y	.404	5¼	7.00	15.00
M	.295	4¼	4.00	10.50	Z	.413	5⅜	7.25	17.00

Millimeter sizes can be furnished on special order.

CLEVELAND STRAIGHT SHANK TWIST DRILLS

No. 110, CARBON STEEL, LONG SET No. 415, HIGH SPEED STEEL, LONG SET

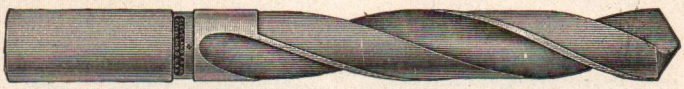


Fig. 1286A

EFFECTIVE JULY 1, 1917

Diam. Inches	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Diam. Inches	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Diam. Inches	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
1/16	3 5/8	.45	.90	39/64	8 3/4	1.60	2.50	1 5/32	11 7/8	4.75	8.90
5/64	4	.45	.90	5/8	8 3/4	1.60	2.50	1 11/64	12	5.00	9.50
3/32	4 3/8	.45	.90	41/64	9	1.70	2.75	1 3/16	12	5.00	9.50
7/64	4 3/4	.45	.90	21/32	9	1.70	2.75	1 13/64	12 1/8	5.25	10.15
1/8	5 1/8	.45	.90	43/64	9 1/4	1.80	3.00	1 7/32	12 1/8	5.25	10.15
9/64	5 3/8	.45	.90	11/16	9 1/4	1.80	3.00	1 15/64	12 1/2	5.50	10.75
5/32	5 3/8	.45	.90	45/64	9 1/2	1.90	3.25	1 1/4	12 1/2	5.50	10.75
11/64	5 3/4	.50	.90	23/32	9 1/2	1.90	3.25	1 17/64	14 1/8	5.75	11.50
3/16	5 3/4	.50	.90	47/64	9 3/4	2.00	3.50	1 9/32	14 1/8	5.75	11.50
13/64	5 7/8	.55	1.00	3/4	9 3/4	2.00	3.50	1 19/64	14 1/4	6.00	12.25
7/32	5 7/8	.55	1.00	49/64	9 7/8	2.10	3.75	1 5/16	14 1/4	6.00	12.25
15/64	6 1/8	.60	1.10	25/32	9 7/8	2.10	3.75	1 21/64	14 3/8	6.25	13.00
1/4	6 1/8	.60	1.10	51/64	10	2.20	4.00	1 11/32	14 3/8	6.25	13.00
17/64	6 1/4	.65	1.20	13/16	10	2.20	4.00	1 23/64	14 1/2	6.50	13.75
9/32	6 1/4	.65	1.20	53/64	10 1/4	2.40	4.40	1 3/8	14 1/2	6.50	13.75
19/64	6 3/8	.70	1.30	27/32	10 1/4	2.40	4.40	1 25/64	14 5/8	7.00	14.65
5/16	6 3/8	.70	1.30	55/64	10 1/2	2.60	4.75	1 13/32	14 5/8	7.00	14.65
21/64	6 1/2	.75	1.40	7/8	10 1/2	2.60	4.75	1 27/64	14 3/4	7.50	15.50
11/32	6 1/2	.75	1.40	57/64	10 5/8	2.80	5.15	1 7/16	14 3/4	7.50	15.50
23/64	6 3/4	.80	1.50	29/32	10 5/8	2.80	5.15	1 29/64	14 7/8	8.00	16.40
3/8	6 3/4	.80	1.50	59/64	10 3/4	3.00	5.50	1 15/32	14 7/8	8.00	16.40
25/64	7	.90	1.65	15/16	10 3/4	3.00	5.50	1 31/64	15	8.50	17.25
13/32	7	.90	1.65	61/64	10 7/8	3.25	5.90	1 1/2	15	8.50	17.25
27/64	7 1/4	1.00	1.75	31/32	10 7/8	3.25	5.90	1 33/64	15 1/8	9.00	18.15
7/16	7 1/4	1.00	1.75	63/64	11	3.50	6.25	1 17/32	15 1/8	9.00	18.15
29/64	7 1/2	1.10	1.90	1	11	3.50	6.25	1 35/64	15 1/4	9.50	19 00
15/32	7 1/2	1.10	1.90	1 1/64	11 1/8	3.75	6.75	1 9/16	15 1/4	9.50	19.00
31/64	7 3/4	1.20	2.00	1 1/32	11 1/8	3.75	6.75	1 37/64	15 3/8	10.00	20.00
1/2	7 3/4	1.20	2.00	1 3/64	11 1/4	4.00	7.25	1 19/32	15 3/8	10.00	20.00
33/64	8	1.30	2.15	1 1/16	11 1/4	4.00	7.25	1 39/64	15 1/2	10.50	21.00
17/32	8	1.30	2.15	1 5/64	11 1/2	4.25	7.75	1 5/8	15 1/2	10.50	21.00
35/64	8 1/4	1.40	2.25	1 3/32	11 1/2	4.25	7.75	1 41/64	15 5/8	11.00	22.00
9/16	8 1/4	1.40	2.25	1 7/64	11 3/4	4.50	8.25	1 21/32	15 5/8	11.00	22.00
37/64	8 1/2	1.50	2.40	1 1/8	11 3/4	4.50	8.25	1 43/64	15 3/4	11.50	23.00
19/32	8 1/2	1.50	2.40	1 9/64	11 7/8	4.75	8.90	1 11/16	15 3/4	11.50	23.00

Discount on carbon steel drills changes at 1½-inch.

Millimeter sizes can be furnished on special order.

CLEVELAND STRAIGHT SHANK TWIST DRILLS

No. 110, CARBON STEEL, LONG SET **No. 415, HIGH SPEED STEEL, LONG SET**

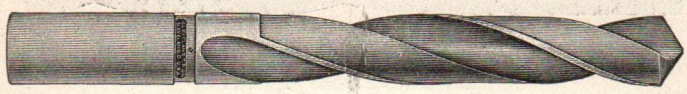


Fig. 348A

EFFECTIVE JULY 1, 1917

Diameter Inches	Length Over All Inches	Price, Each		Diameter Inches	Length Over All Inches	Price, Each		Diameter Inches	Length Over All Inches	Price, Each	
		Carbon Steel	High Speed Steel			Carbon Steel	High Speed Steel			Carbon Steel	High Speed Steel
1 45/64	15 7/8	12.00	24.00	2 5/4	17 1/2	24.50	45.00	2 49/64	20 1/2	39.25	87.50
1 23/32	15 7/8	12.00	24.00	2 1/4	17 1/2	24 50	45.00	2 25/32	20 1/2	39.25	87.50
1 47/64	16	12.50	25.00	2 1/64	17 1/2	25 25	47.50	2 51/64	20 1/2	40.50	90.00
1 3/4	16	12.50	25.00	2 9/32	17 1/2	25.25	47.50	2 13/16	20 1/2	40.50	90.00
1 49/64	16 1/8	13.25	26.25	2 19/64	17 1/2	26.00	50.00	2 53/64	21	41.75	92.50
1 25/32	16 1/8	13.25	26.25	2 5/16	17 1/2	26.00	50.00	2 27/32	21	41.75	92.50
1 51/64	16 1/4	14.00	27.50	2 21/64	18	26.75	52.50	2 55/64	21	43.00	95.00
1 13/16	16 1/4	14.00	27.50	2 11/32	18	26.75	52.50	2 7/8	21	43.00	95.00
1 53/64	16 3/8	14.75	28.75	2 23/64	18	27.50	55.00	2 57/64	21	44.25	97.50
1 27/32	16 3/8	14.75	28.75	2 3/8	18	27.50	55.00	2 29/32	21	44.25	97.50
1 55/64	16 1/2	15.50	30.00	2 25/64	18 1/2	28.25	57.50	2 59/64	21	45.50	100.00
1 7/8	16 1/2	15.50	30.00	2 13/32	18 1/2	28.25	57.50	2 15/16	21	45.50	100.00
1 57/64	16 1/2	16.25	31.25	2 27/64	18 1/2	29.00	60.00	2 61/64	22	46.75	102.50
1 29/32	16 1/2	16.25	31.25	2 7/16	18 1/2	29.00	60.00	2 31/32	22	46.75	102.50
1 59/64	16 1/2	17.00	32.50	2 29/64	19	29.75	62.50	2 63/64	22	48.00	105.00
1 15/16	16 1/2	17.00	32.50	2 15/32	19	29.75	62.50	3	22	48.00	105.00
1 61/64	16 1/2	17.75	33.75	2 31/64	19	30.50	65.00	3 1/16	22	52.00	112.50
1 31/32	16 1/2	17.75	33.75	2 1/2	19	30.50	65.00	3 1/8	22	56.00	120.00
1 63/64	16 1/2	18.50	35.00	2 33/64	19 1/4	31.25	67.50	3 3/16	22	60.00	127.50
2	16 1/2	18.50	35.00	2 17/32	19 1/4	31.25	67.50	3 1/4	23	65.00	135.00
2 1/64	16 1/2	19.25	36.25	2 35/64	19 1/4	32.00	70.00	3 5/16	23	70.00	142.50
2 1/32	16 1/2	19.25	36.25	2 9/16	19 1/4	32.00	70.00	3 3/8	23	75.00	150.00
2 3/64	17	20.00	37.50	2 37/64	19 1/2	33.00	72.50	3 7/16	23	80.00	157.50
2 1/16	17	20.00	37.50	2 19/32	19 1/2	33.00	72.50	3 1/2	24	85.00	165.00
2 5/64	17	20.75	38.75	2 39/64	19 1/2	34.00	75.00	3 9/16	24	91.00	172.50
2 3/32	17	20.75	38.75	2 5/8	19 1/2	34.00	75.00	3 5/8	24	98.00	180.00
2 7/64	17	21.50	40.00	2 41/64	20	35.00	77.50	3 11/16	24	105.00	187.50
2 1/8	17	21.50	40.00	2 21/32	20	35.00	77.50	3 3/4	24	112.00	195.00
2 9/64	17	22.25	41.25	2 43/64	20	36.00	80.00	3 13/16	24	119.00	202.50
2 5/32	17	22.25	41.25	2 11/16	20	36.00	80.00	3 7/8	24	126.00	210.00
2 11/64	17	23.00	42.50	2 45/64	20 1/2	37.00	82.50	3 15/16	24	133.00	217.50
2 3/16	17	23.00	42.50	2 23/32	20 1/2	37.00	82.50	4	25	140.00	225.00
2 13/64	17 1/2	23.75	43.75	2 47/64	20 1/2	38.00	85.00	...	..	.....	.....
2 7/32	17 1/2	23.75	43.75	2 3/4	20 1/2	38.00	85.00	...	..	.....	.....

Discount on carbon steel drills changes at 1½-inch.

Millimeter sizes can be furnished on special order.

CLEVELAND STRAIGHT SHANK TWIST DRILLS

WIRE GAUGE No. 108A, CARBON STEEL **WIRE GAUGE No. 418, HIGH SPEED**

Fig. 4591A

EFFECTIVE JULY 1, 1917

Wire Gauge Number	Decimal Diameter Inches	Length Over All Inches	Price, per Dozen Carbon Steel	Price, per Dozen High Speed	Wire Gauge Number	Decimal Diameter Inches	Length Over All Inches	Price, per Dozen Carbon Steel	Price, per Dozen High Speed
1	.2280	4	2.75	7.00	41	.0960	2 5/16	1.70	5.70
2	.2210	3 15/16	2.75	7.00	42	.0935	2 5/16	1.70	5.70
3	.2130	3 15/16	2.75	7.00	43	.0890	2 1/4	1.70	5.70
4	.2090	3 7/8	2.75	7.00	44	.0860	2 3/16	1.70	5.70
5	.2055	3 13/16	2.75	7.00	45	.0820	2 3/16	1.70	5.70
6	.2040	3 13/16	2.50	7.00	46	.0810	2 1/8	1.65	5.70
7	.2010	3 3/4	2.50	7.00	47	.0785	2 1/16	1.65	5.70
8	.1990	3 11/16	2.50	7.00	48	.0760	2 1/16	1.65	5.70
9	.1960	3 11/16	2.50	7.00	49	.0730	2	1.65	5.70
10	.1935	3 5/8	2.50	7.00	50	.0700	1 15/16	1.65	5.70
11	.1910	3 9/16	2.25	6.30	51	.0670	1 15/16	1.60	5.70
12	.1890	3 9/16	2.25	6.30	52	.0635	1 7/8	1.60	5.70
13	.1850	3 1/2	2.25	6.30	53	.0595	1 13/16	1.60	5.70
14	.1820	3 7/16	2.25	6.30	54	.0550	1 13/16	1.60	5.70
15	.1800	3 7/16	2.25	6.30	55	.0520	1 3/4	1.60	5.70
16	.1770	3 3/8	2.00	6.30	56	.0465	1 11/16	1.55	5.70
17	.1730	3 5/16	2.00	6.30	57	.0430	1 11/16	1.55	5.70
18	.1695	3 5/16	2.00	6.30	58	.0420	1 5/8	1.55	5.70
19	.1660	3 1/4	2.00	6.30	59	.0410	1 9/16	1.55	5.70
20	.1610	3 3/16	2.00	6.30	60	.0400	1 9/16	1.55	5.70
21	.1590	3 3/16	1.90	6.10	61	.0390	1 1/2	1.50	....
22	.1570	3 1/8	1.90	6.10	62	.0380	1 1/2	1.50	....
23	.1540	3 1/16	1.90	6.10	63	.0370	1 1/2	1.50	....
24	.1520	3 1/16	1.90	6.10	64	.0360	1 1/2	1.50	....
25	.1495	3	1.90	6.10	65	.0350	1 1/2	1.50	....
26	.1470	2 15/16	1.80	6.10	66	.0330	1 1/2	1.50	....
27	.1440	2 15/16	1.80	6.10	67	.0320	1 7/16	1.50	....
28	.1405	2 7/8	1.80	6.10	68	.0310	1 7/16	1.50	....
29	.1360	2 13/16	1.80	6.10	69	.02925	1 3/8	1.50	....
30	.1285	2 13/16	1.80	6.10	70	.0280	1 5/16	1.50	....
31	.1200	2 3/4	1.75	5.90	71	.0260	1 5/16	1.50	....
32	.1160	2 11/16	1.75	5.90	72	.0250	1 1/4	1.50	....
33	.1130	2 11/16	1.75	5.90	73	.0240	1 3/16	1.50	....
34	.1110	2 5/8	1.75	5.90	74	.0225	1 1/8	1.50	....
35	.1100	2 9/16	1.75	5.90	75	.0210	1 1/16	1.50	....
36	.1065	2 9/16	1.75	5.90	76	.0200	1	1.50	....
37	.1040	2 1/2	1.75	5.90	77	.0180	15/16	1.50	....
38	.1015	2 7/16	1.75	5.90	78	.0160	7/8	1.50	....
39	.0995	2 7/16	1.75	5.90	79	.0145	13/16	1.50	....
40	.0980	2 3/8	1.75	5.90	80	.0135	3/4	1.50	....

CLEVELAND TWIST DRILLS

SQUARE SHANK RATCHET DRILLS

No. 111, CARBON STEEL — **No. 414, HIGH SPEED STEEL**

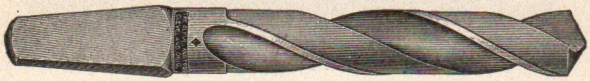


Fig. 9871A

Effective July 1, 1917

Diam. In.	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Diam. Inches	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Diam. Inches	Length Over All Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
1/8	4 1/2	.90	2.30	11/16	6 1/2	1.45	3.40	1 1/4	9	3.65	7.90
5/32	4 1/2	.95	2.35	23/32	6 1/2	1.50	3.50	1 9/32	9	3.75	8.25
3/16	4 1/2	.95	2.40	3/4	6 1/2	1.55	3.65	1 5/16	9	3.90	8.60
7/32	5	1.00	2.45	25/32	6 1/2	1.65	3.80	1 11/32	9	4.05	9.00
1/4	5	1.00	2.55	13/16	7	1.75	4.00	1 3/8	9	4.20	9.40
9/32	5	1.05	2.55	27/32	7	1.90	4.20	1 13/32	9	4.35	9.80
5/16	5	1.10	2.60	7/8	7 1/2	2.05	4.50	1 7/16	9	4.50	10.20
11/32	5	1.15	2.65	29/32	7 1/2	2.20	4.70	1 15/32	9	4.65	10.60
3/8	6	1.20	2.70	15/16	8	2.30	5.00	1 1/2	9	4.80	11.00
13/32	6 1/4	1.25	2.75	31/32	8	2.40	5.25	1 9/16	9	5.10	12.50
7/16	6 1/4	1.25	2.80	1	8 1/2	2.55	5.50	1 5/8	9	5.40	14.00
15/32	6 1/4	1.30	2.85	1 1/32	8 1/2	2.70	5.75	1 11/16	9	5.75	15.50
1/2	6 1/2	1.30	2.90	1 1/16	8 1/2	2.85	6.00	1 3/4	9	6.10	17.00
17/32	6 1/2	1.35	2.95	1 3/32	8 1/2	3.00	6.30	1 13/16	9	6.50	18.50
9/16	6 1/2	1.35	3.00	1 1/8	9	3.10	6.70	1 7/8	9	6.90	20.50
19/32	6 1/2	1.40	3.10	1 5/32	9	3.25	7.00	1 15/16	9	7.30	22.50
5/8	6 1/2	1.40	3.20	1 3/16	9	3.35	7.30	2	9	7.75	25.00
21/32	6 1/2	1.45	3.30	1 7/32	9	3.50	7.60	...	..	....	.....

No. 1 shanks are 3/8x5/8x1 1/2 inches long. No. 2 shanks are 1/2x3/4x1 3/4 inches long. Unless otherwise specified No. 1 shank will be furnished, except on high speed drills over 1 inch, which will be equipped with No. 2 shank. To avoid mistakes in ordering, specify number, or dimensions of shank.

BIT STOCK DRILLS, FOR METAL OR WOOD

No. 114

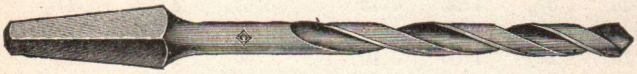


Fig. 9871B

Diam. Inches	Length Over All Inches	Price per Dozen	Diam. Inches	Length Over All Inches	Price per Dozen	Diam. Inches	Length Over All Inches	Price per Dozen	Diam. Inches	Length Over All Inches	Price per Dozen
1/16	3 5/16	2.50	15/64	5	4.75	15/32	6 3/4	11.75	13/16	7 1/2	27.00
5/64	3 7/16	2.60	1/4	5	5.00	1/2	7	13.00	27/32	7 1/2	28.50
3/32	3 9/16	2.70	17/64	5 1/4	5.50	17/32	7 1/4	14.25	7/8	7 1/2	30.00
7/64	3 11/16	2.85	9/32	5 1/4	6.00	9/16	7 1/2	15.50	29/32	7 1/2	31.50
1/8	3 13/16	3.00	19/64	5 1/2	6.50	19/32	7 1/2	16.75	15/16	7 1/2	33.00
9/64	3 15/16	3.25	5/16	5 1/2	7.00	5/8	7 1/2	18.00	31/32	7 1/2	34.50
5/32	4 1/16	3.50	21/64	5 3/4	7.50	21/32	7 1/2	19.50	1	7 1/2	36.00
11/64	4 3/16	3.75	11/32	5 3/4	8.00	11/16	7 1/2	21.00	1 1/16	7 1/2	39.00
3/16	4 5/16	4.00	3/8	6	8.50	23/32	7 1/2	22.50	1 1/8	7 1/2	42.00
13/64	4 3/4	4.25	13/32	6 1/4	9.25	3/4	7 1/2	24.00	1 3/16	7 1/2	45.00
7/32	4 3/4	4.50	7/16	6 1/2	10.50	25/32	7 1/2	25.50	1 1/4	7 1/2	48.00

Millimeter sizes can be furnished on special order.

CLEVELAND DRILLS FOR BLACKSMITHS' DRILL PRESSES

No. 118 CARBON STEEL **No. 434 HIGH SPEED STEEL**

SHANKS ½ INCH DIAMETER AND 2½ INCHES LONG

Fig. 24514A

No. 120 CARBON STEEL **No. 436 HIGH SPEED STEEL**

SHANKS ½ INCH DIAMETER AND 2¼ INCHES LONG

Fig. 24514B

EFFECTIVE JULY 1, 1917

Diam. Inches	Length Over All, Inches No. 118 No. 434	Length Over All, Inches No. 120 No. 436	Price, Each No. 118 Carbon Steel	Price, Each No. 434 High Speed Steel	Price, Each No. 120 Carbon Steel	Price, Each No. 436 High Speed Steel
1/8	5 1/8	4 7/8	.45	....	.45	....
5/32	5 3/8	4 7/8	.45	....	.45	....
3/16	5 5/8	5 5/8	.50	....	.50	....
7/32	5 7/8	5 5/8	.55	....	.55	....
1/4	6 1/8	6	.60	1.10	.60	1.10
9/32	6 1/4	6	.65	1.20	.65	1.20
5/16	6 3/8	6	.70	1.30	.70	1.30
11/32	6 1/2	6	.75	1.40	.75	1.40
3/8	6 3/4	6	.80	1.50	.80	1.45
13/32	7	6	.90	1.65	.85	1.55
7/16	7 1/4	6	1.00	1.75	.90	1.60
15/32	7 1/2	6	1.10	1.90	.95	1.70
1/2	7 3/4	6	1.20	2.00	1.00	1.75
17/32	8	6	1.30	2.15	1.05	1.90
9/16	8 1/4	6	1.40	2.25	1.10	2.05
19/32	8 1/2	6	1.50	2.40	1.20	2.20
5/8	8 3/4	6	1.60	2.50	1.30	2.30
21/32	9	6	1.70	2.75	1.40	2.40
11/16	9 1/4	6	1.80	3.00	1.50	2.50
23/32	9 1/2	6	1.90	3.25	1.60	2.65
3/4	9 3/4	6	2.00	3.50	1.70	2.75
25/32	9 7/8	6	2.10	3.75	1.80	2.90
13/16	10	6	2.20	4.00	1.90	3.00
27/32	10 1/4	6	2.40	4.40	2.00	3.15
7/8	10 1/2	6	2.60	4.75	2.10	3.30
29/32	10 5/8	6	2.80	5.15	2.20	3.50
15/16	10 3/4	6	3.00	5.50	2.30	3.70
31/32	10 7/8	6	3.25	5.90	2.40	3.90
1	11	6	3.50	6.25	2.50	4.10
1 1/32	11 1/8	6	3.75	6.75	2.60	4.30
1 1/16	11 1/4	6	4.00	7.25	2.70	4.50
1 3/32	11 1/2	6	4.25	7.75	2.80	4.75
1 1/8	11 3/4	6	4.50	8.25	2.90	5.00
1 5/32	11 7/8	6	4.75	8.90	3.00	5.25
1 3/16	12	6	5.00	9.50	3.10	5.50
1 7/32	12 1/8	6	5.25	10.15	3.20	5.80
1 1/4	12 1/4	6	5.50	10.75	3.30	6.10
1 9/32	12 1/4	6	5.75	11.50	3.45	6.40
1 5/16	12 3/8	6	6.00	12.25	3.60	6.70
1 11/32	12 3/8	6	6.25	13.00	3.75	7.00
1 3/8	12 1/2	6	6.50	13.75	3.90	7.40
1 13/32	12 1/2	6	7.00	14.65	4.05	7.80
1 7/16	12 5/8	6	7.50	15.50	4.20	8.20
1 15/32	12 5/8	6	8.00	16.40	4.35	8.60
1 1/2	12 5/8	6	8.50	17.25	4.50	9.00

High speed drills with ½-inch shanks will be furnished in sizes over ¾-inch diameter only at customer's risk, as we do not consider the shanks strong enough.

Unless otherwise specified these drills will always be furnished with flatted shanks.

CLEVELAND CENTER DRILLS, REAMERS, ETC.

No. 125 CENTER DRILL

Fig. 24225A

No. 125A CENTER REAMERS

No. 1

Fig. 24225B

No. 2

Fig. 24225C

EFFECTIVE JULY 1, 1917

No. 125 CENTER DRILLS

Diameter...inches	1/16	5/64	3/32	7/64	1/8	9/64	5/32	11/64	3/16	13/64	7/32	15/64	1/4	17/64
Length..... "	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Price...per dozen	1.60	1.65	1.70	1.75	1.80	1.85	1.90	2.00	2.25	2.50	2.75	3.00	3.25	3.50

No. 125A CENTER REAMERS

Size, Shank.....inches	3/16	1/4	3/8	1/2	1/2
" Body..... "	1/4	3/8	1/2	5/8	3/4
Price, No. 1.....each	.30	.35	.40	.65	.85
" " 1.....per dozen	3.60	4.20	4.80	7.80	10.20
" " 2.....each	.25	.30	.35	.60	.80
" " 2.....per dozen	3.00	3.60	4.20	7.20	9.60

Less than 1/2 dozen of a size will be charged at single price each. Included angle, 60°.

DRILLS AND COUNTERSINKS COMBINED

No. 98 DRILL AND COUNTERSINK COMBINED

Fig. 24225D

No. 98A DRILL AND COUNTERSINK COMBINED

Fig. 24225E

Nos. 98 AND 498

Size	Diam. of Body Inches	Diam. of Drills	Price, per Dozen Carbon Steel No. 98	Price, per Dozen High Speed Steel No. 498
20	1/8	No. 57	2.00	6.00
21	13/64	" 55	2.25	6.00
22	13/64	1/16 in.	2.25	6.00
23	15/64	No. 49	2.50	6.00
24	15/64	" 45	2.50	6.00
25	.302	3/32 in.	2.75	6.00
26	.302	3/32 & 1/8 in.	2.75	6.00
27	.302	1/8 in.	2.75	6.00
28	7/16	5/32 "	3.50	9.00
29	7/16	3/16 & 5/32 in.	3.50	9.00
30	7/16	3/16 in.	3.50	9.00

Included angle of No. 98 is 60 degrees.

Nos. 98A AND 498A

Size No.	Diam. of Body Inches	Diam. of Drills Inches	Price, per Dozen Carbon Steel No. 98A	Price, per Dozen High Speed Steel No. 498A
00	1/2	7/32 and 9/32	4.60	12.00
1	1/2	7/32	4.60	12.00
2	1/2	9/32	4.60	12.00
3	1/2	11/32	5.00	12.00
4	1/2	13/32	5.00	12.00
5	.648	7/32	7.25	18.00
6	.648	9/32	7.25	18.00
7	.648	11/32	7.75	18.00
8	.648	13/32	7.75	18.00
..	...	..	....	....
..	....	..	....	....

Nos. 115A AND 115B MACHINE COUNTERSINKS

Fig. 24225F

No. 115A—Shanks 1/2 inch diameter, 2 1/4 inches long.
No. 115B—Shanks .648 inch diameter, 2 1/4 inches long.

Diameter.....inches	5/8	3/4	7/8	1
Price .....per dozen	9.35	12.25	14.00	15.75

The included angle at point is 60 degrees. Will furnish 80-degree angle when specified.
Unless otherwise specified, 1/2-inch shanks are furnished.

CLEVELAND SHELL REAMERS

FLUTED
No. 130A CARBON STEEL
No. 620 HIGH SPEED STEEL

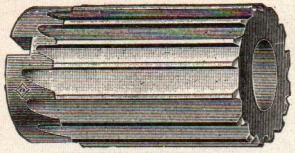


Fig. 9779A

ROSE
No. 130B CARBON STEEL
No. 622 HIGH SPEED STEEL

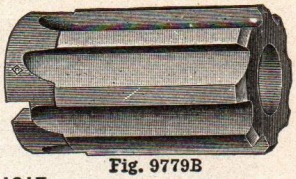


Fig. 9779B

EFFECTIVE JULY 1, 1917

Fitting Arbor	Diam. Inches	Size Hole Inches	Length OverAll Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
No. 3	1/2	1/4	2	1.70	3.25
	9/16	1/4	2	1.80	3.40
	5/8	1/4	2	1.90	3.55
No. 4	11/16	3/8	2 1/4	2.00	3.70
	3/4	3/8	2 1/4	2.10	3.85
No. 5	13/16	1/2	2 1/2	2.20	4.00
	7/8	1/2	2 1/2	2.30	4.25
	15/16	1/2	2 1/2	2.40	4.50
	1	1/2	2 1/2	2.50	4.75
No. 6	1 1/16	5/8	2 3/4	2.70	5.00
	1 1/8	5/8	2 3/4	2.90	5.25
	1 3/16	5/8	2 3/4	3.10	5.50
	1 1/4	5/8	2 3/4	3.30	5.75
No. 7	1 5/16	3/4	3	3.55	6.00
	1 3/8	3/4	3	3.80	6.50
	1 7/16	3/4	3	4.05	7.00
	1 1/2	3/4	3	4.30	7.50
	1 9/16	3/4	3	4.55	8.25
	1 5/8	3/4	3	4.80	9.00
No. 8	1 11/16	1	3 1/2	5.10	9.75
	1 3/4	1	3 1/2	5.40	10.50
	1 13/16	1	3 1/2	5.70	11.25
	1 7/8	1	3 1/2	6.00	12.00
	1 15/16	1	3 1/2	6.30	12.75
	2	1	3 1/2	6.60	13.50
No. 9	2 1/16	1 1/4	3 3/4	6.95	14.25
	2 1/8	1 1/4	3 3/4	7.30	15.00
	2 3/16	1 1/4	3 3/4	7.65	15.75
	2 1/4	1 1/4	3 3/4	8.00	16.50
	2 5/16	1 1/4	3 3/4	8.35	17.25
	2 3/8	1 1/4	3 3/4	8.70	18.00
	2 7/16	1 1/4	3 3/4	9.05	18.75
	2 1/2	1 1/4	3 3/4	9.40	19.50
No. 10	2 9/16	1 1/2	4	9.80	20.50
	2 5/8	1 1/2	4	10.20	21.75
	2 11/16	1 1/2	4	10.60	23.00
	2 3/4	1 1/2	4	11.00	24.25
	2 13/16	1 1/2	4	11.40	25.50
	2 7/8	1 1/2	4	11.80	27.00
No. 10	2 15/16	1 1/2	4	12.20	28.50
	3	1 1/2	4	12.60	30.00
No. 11	3 1/16	1 3/4	4 1/2	13.10	31.50
	3 1/8	1 3/4	4 1/2	13.60	33.25
	3 3/16	1 3/4	4 1/2	14.10	35.25
	3 1/4	1 3/4	4 1/2	14.60	37.50
	3 5/16	1 3/4	4 1/2	15.10	40.00
	3 3/8	1 3/4	4 1/2	15.60	42.50
	3 7/16	1 3/4	4 1/2	16.10	45.25
	3 1/2	1 3/4	4 1/2	16.60	48.00
No. 12	3 9/16	2	5	17.20	50.75
	3 5/8	2	5	17.80	53.50
	3 11/16	2	5	18.40	56.50
	3 3/4	2	5	19.00	59.50
	3 13/16	2	5	19.60	62.75
	3 7/8	2	5	20.20	66.00
	3 15/16	2	5	20.80	69.25
	4	2	5	21.40	72.50
No. 13	4 1/8	2 1/4	5 1/2	22.90	79.00
	4 1/4	2 1/4	5 1/2	24.40	85.50
	4 3/8	2 1/4	5 1/2	25.90	92.00
	4 1/2	2 1/4	5 1/2	27.40	98.50
No. 14	4 5/8	2 1/2	6	29.30	105.00
	4 3/4	2 1/2	6	31.20	111.50
	4 7/8	2 1/2	6	33.10	118.00
	5	2 1/2	6	35.00	125.00
	5 1/8	2 1/2	6	37.40	132.50
	5 1/4	2 1/2	6	39.80	140.00
	5 3/8	2 1/2	6	42.20	147.50
	5 1/2	2 1/2	6	44.60	155.00
No. 15	5 5/8	2 3/4	6 1/2	47.60	163.75
	5 3/4	2 3/4	6 1/2	50.60	172.50
	5 7/8	2 3/4	6 1/2	53.60	181.25
	6	2 3/4	6 1/2	56.60	190.00

Shell reamers of any size or length made to order.

CLEVELAND REAMERS AND DRILLS

PATENT ARBORS FOR SHELL TOOLS

No. 78—STRAIGHT SHANK

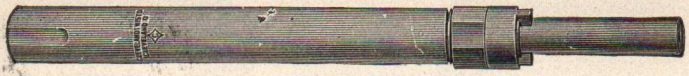


Fig. 24465A

No. 79—TAPER SHANK

Fig. 24465B

Effective July 1, 1917

This arbor is provided with a sliding collar which can be forced forward by a turn or two of the adjusting nut which bears on it, thus quickly releasing the shell tool.

Size No.	Fitting Sizes Inches	Length Over All Inches	Taper Shank	Price No. 78 Straight Shank	Price No. 79 Taper Shank	Size No.	Fitting Sizes Inches	Length Over All Inches	Taper Shank	Price No. 78 Straight Shank	Price No. 79 Taper Shank
3	1/2 to 5/8	8	No. 1	**3.60**	**4.35**	10	2 33/64 to 3	14	No. 5	**7.90**	**9.45**
4	41/64 " 3/4	9	No. 2	**4.05**	**4.90**	11	3 1/64 " 3 1/2	15		**11.25**	**13.50**
5	49/64 " 1	9 1/2		**4.50**	**5.40**	12	3 33/64 " 4	16		**15.75**	**18.90**
6	1 1/64 " 1 1/4	10	No. 3	**4.95**	**5.95**	13	4 1/64 " 4 1/2	17		**20.25**	**24.30**
7	1 17/64 " 1 5/8	11		**5.40**	**6.45**	14	4 33/64 " 5 1/2	18		**27.00**	**32.40**
8	1 41/64 " 2	12	No. 4	**6.00**	**7.20**	15	5 33/64 " 6	19	No. 6	**33.00**	**39.60**
9	2 1/64 " 2 1/2	13		**6.75**	**8.10**	..	.....	..		.....	.....

No. 133 ARBORS FOR SHELL REAMERS AND SHELL DRILLS

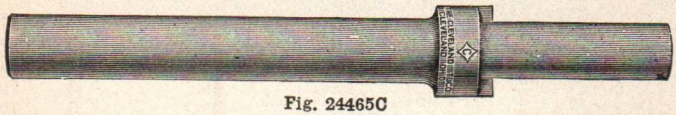


Fig. 24465C

Size No.	Fitting Sizes 130A and 130B Shell Reamers Inches	Length Over All Inches	Price Each	Size No.	Fitting Sizes 130A and 130B Shell Reamers Inches	Length Over All Inches	Price Each	Size No.	Fitting Sizes 130A and 130B Shell Reamers Inches	Length Over All Inches	Price Each
3	1/2 to 5/8	8	**2.40**	8	1 41/64 to 2	12	**4.00**	13	4 1/64 to 4 1/2	17	**13.50**
4	41/64 " 3/4	9	**2.70**	9	2 1/64 " 2 1/2	13	**4.50**	14	4 33/64 " 5 1/2	18	**18.00**
5	49/64 " 1	9 1/2	**3.00**	10	2 33/64 " 3	14	**5.25**	15	5 33/64 " 6 1/2	19	**22.00**
6	1 1/64 " 1 1/4	10	**3.30**	11	3 1/64 " 3 1/2	15	**7.50**	..	.....	..	.....
7	1 17/64 " 1 5/8	11	**3.60**	12	3 33/64 " 4	16	**10.50**	..	.....	..	.....

No. 133A TAPER SHANK ARBORS FOR SHELL REAMERS AND SHELL DRILLS

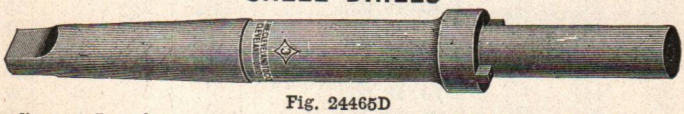


Fig. 24465D

Size No.	Fitting Sizes No. 130A and 130B Shell Reamers, Inches	Length Over All Inches	Shank Taper	Price Each	Size No.	Fitting Sizes No. 130A and 130B Shell Reamers, Inches	Length Over All Inches	Shank Taper	Price Each
3	1/2 to 5/8	8 1/2	No. 1	**2.90**	10	2 33/64 to 3	14	No. 5	**6.30**
4	41/64 " 3/4	9	No. 2	**3.25**	11	3 1/64 " 3 1/2	15		**9.00**
5	49/64 " 1	9 1/2		**3.60**	12	3 33/64 " 4	16		**12.60**
6	1 1/64 " 1 1/4	10	No. 3	**3.95**	13	4 1/64 " 4 1/2	17		**16.20**
7	1 17/64 " 1 5/8	11		**4.30**	14	4 33/64 " 5 1/2	18		**21.60**
8	1 41/64 " 2	12	No. 4	**4.80**	15	5 33/64 " 6 1/2	19	No. 6	**26.40**
9	2 1/64 " 2 1/2	13		**5.40**	..	.....	..		.....

CLEVELAND COMMON SENSE EXPANSION REAMERS

ECCENTRIC FLUTES

No. 129

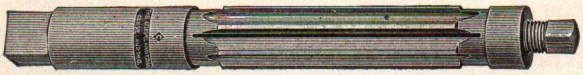


Fig. 16486A

EFFECTIVE JULY 1, 1917

Limits of expansion recommended for these reamers are as follows: Sizes 1/4 to 15/32, .005 inch; 1/2 to 31/32, .008 inch; 1 to 1 23/32, .010 inch; 1 3/4 to 2 1/2, .012 inch. All sizes and dimensions not listed are special and subject to special prices.

Diam. Inches	Length of Flute Inches	Length Over All Inches	Price Each	Diam. Inches	Length of Flute Inches	Length Over All Inches	Price Each
1/4	2	3 3/4	**3.00**	31/32	4 3/4	8 9/32	**6.50**
9/32	2 1/8	3 7/8	**3.05**	1	4 7/8	8 1/2	**6.75**
5/16	2 19/64	4	**3.10**	1 1/16	5 1/8	9	**7.25**
11/32	2 5/16	4 1/8	**3.15**	1 1/8	5 1/4	9 1/4	**7.75**
3/8	2 1/2	4 1/4	**3.20**	1 3/16	5 3/8	9 9/16	**8.30**
13/32	2 7/16	4 3/8	**3.25**	1 1/4	5 1/2	9 7/8	**8.90**
7/16	2 33/64	4 1/2	**3.30**	1 5/16	5 3/4	10 1/8	**9.50**
15/32	2 33/64	4 3/4	**3.35**	1 3/8	5 7/8	10 3/8	**10.50**
1/2	2 33/64	5	**3.40**	1 7/16	5 15/16	10 5/8	**11.50**
17/32	2 5/8	5 3/16	**3.50**	1 1/2	6	10 3/4	**12.50**
9/16	2 3/4	5 3/8	**3.65**	1 9/16	6 1/8	11 1/8	**13.00**
19/32	2 7/8	5 9/16	**3.80**	1 5/8	6 1/4	11 1/4	**13.50**
5/8	3 1/8	5 3/4	**4.00**	1 11/16	6 3/8	11 3/8	**14.00**
21/32	3 5/16	6	**4.20**	1 3/4	6 1/2	11 1/2	**14.50**
11/16	3 1/2	6 1/4	**4.40**	1 13/16	6 5/8	11 3/4	**15.00**
23/32	3 9/16	6 7/16	**4.60**	1 7/8	6 3/4	11 3/4	**15.50**
3/4	3 5/8	6 5/8	**4.80**	1 15/16	6 7/8	12	**16.00**
25/32	3 13/16	6 7/8	**5.00**	2	7	12 1/4	**16.50**
13/16	4	7 1/8	**5.25**	2 1/8	7 1/8	12 5/8	**17.50**
27/32	4 3/16	7 3/8	**5.50**	2 1/4	7 1/4	13	**18.50**
7/8	4 5/16	7 9/16	**5.75**	2 3/8	7 3/8	13 1/2	**19.50**
29/32	4 7/16	7 13/16	**6.00**	2 1/2	7 1/2	14	**20.50**
15/16	4 9/16	8 1/16	**6.25**	...	...	....	.....

The pilots on these reamers are ground slightly undersize. Reamers for brass or bronze require special clearance and are so furnished on request.

CLEVELAND HAND REAMERS

ECCENTRIC FLUTES

No. 128A, CARBON STEEL **No. 624, HIGH SPEED STEEL**

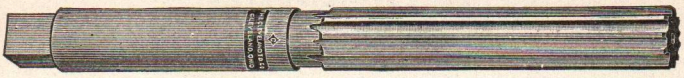


Fig. 7746A

Effective July 1, 1917

Diameter Inches	Length, Inches Flute	Length, Inches Over All	Price, Each Carbon Steel	Price, Each High Speed Steel
1/8	1 1/2	3	1.00	3.00
9/64	1 5/8	3 1/4	1.10	3.25
5/32	1 5/8	3 1/4	1.10	3.25
11/64	1 3/4	3 1/2	1.20	3.25
3/16	1 3/4	3 1/2	1.20	3.25
13/64	1 7/8	3 3/4	1.30	3.50
7/32	1 7/8	3 3/4	1.30	3.50
15/64	2	4	1.40	3.50
1/4	2	4	1.40	3.50
17/64	2 1/8	4 1/4	1.45	3.75
9/32	2 1/8	4 1/4	1.45	3.75
19/64	2 1/4	4 1/2	1.50	3.75
5/16	2 1/4	4 1/2	1.50	3.75
21/64	2 3/8	4 3/4	1.55	4.25
11/32	2 3/8	4 3/4	1.55	4.25
23/64	2 1/2	5	1.60	4.25
3/8	2 1/2	5	1.60	4.25
25/64	2 5/8	5 1/4	1.70	4.75
13/32	2 5/8	5 1/4	1.70	4.75
27/64	2 3/4	5 1/2	1.75	4.75
7/16	2 3/4	5 1/2	1.75	4.75
29/64	2 7/8	5 3/4	1.85	5.25
15/32	2 7/8	5 3/4	1.85	5.25
31/64	3	6	1.90	5.25
1/2	3	6	1.90	5.25
17/32	3 1/8	6 1/4	1.95	5.75
9/16	3 1/4	6 1/2	2.00	5 75
19/32	3 3/8	6 3/4	2.10	6 25
5/8	3 1/2	7	2.20	6.25
21/32	3 43/64	7 11/32	2.30	6.75
11/16	3 27/32	7 11/16	2.40	6.75
23/32	4 1/16	8 1/8	2.50	7.25
3/4	4 3/16	8 3/8	2.60	7.25
25/32	4 23/64	8 23/32	2.70	7.75
13/16	4 17/32	9 1/16	2.80	7.75
27/32	4 11/16	9 3/8	2 95	8.50
7/8	4 27/32	9 11/16	3.10	8.50
29/32	5 3/64	10 3/32	3.25	9.50
15/16	5 1/8	10 1/4	3.40	9.50
31/32	5 11/32	10 11/16	3.55	10.50
1	5 7/16	10 7/8	3.70	10.50
1 1/32	5 17/32	11 1/16	3.85	11.50
1 1/16	5 5/8	11 1/4	4.00	11.50
1 3/32	5 23/32	11 7/16	4.15	12.75
1 1/8	5 13/16	11 5/8	4.30	12.75
1 5/32	5 29/32	11 13/16	4.45	14.25
1 3/16	6	12	4.60	14.25
1 7/32	6 1/16	12 1/8	4.75	15.75
1 1/4	6 1/8	12 1/4	4.90	15.75
1 9/32	6 11/64	12 11/32	5.05	17.25
1 5/16	6 7/32	12 7/16	5.20	17.25
1 11/32	6 17/64	12 17/32	5.40	18.75
1 3/8	6 5/16	12 5/8	5.60	18.75
1 13/32	6 23/64	12 23/32	5.80	20.50
1 7/16	6 13/32	12 13/16	6.00	20.50
1 15/32	6 29/64	12 29/32	6.20	22.25
1 1/2	6 1/2	13	6.40	22.25
1 17/32	6 1/2	13	6.60	24.00
1 9/16	6 1/2	13	6.80	24.00
1 19/32	6 1/2	13	7.00	25.75
1 5/8	6 1/2	13	7.20	25.75
1 21/32	6 3/4	13 1/2	7.40	27.50
1 11/16	6 3/4	13 1/2	7.60	27 50
1 23/32	6 3/4	13 1/2	7.80	29 50
1 3/4	6 3/4	13 1/2	8.00	29 50
1 25/32	6 3/4	13 1/2	8.20	31.50
1 13/16	6 3/4	13 1/2	8.40	31.50
1 27/32	6 3/4	13 1/2	8.60	33.50
1 7/8	7	14	8.80	33.50
1 29/32	7	14	9.00	35.75
1 15/16	7	14	9.20	35 75
1 31/32	7	14	9.40	38.00
2	7	14	9.60	38.00
2 1/16	7 1/4	14 1/2	10.00	40.75
2 1/8	7 1/4	14 1/2	10.40	43.50
2 3/16	7 1/2	15	10.80	46.25
2 1/4	7 1/2	15	11.30	49.00
2 5/16	7 1/2	15	11.80	51.75
2 3/8	7 1/2	15	12.30	55.00
2 7/16	7 3/4	15 1/2	12.80	58.25
2 1/2	7 3/4	15 1/2	13.40	61.50
2 9/16	7 3/4	15 1/2	14.00	64.75
2 5/8	8	16	14.60	68.00
2 11/16	8	16	15.40	71.25
2 3/4	8	16	16.20	74.50
2 13/16	8 1/4	16 1/2	17.00	77.75
2 7/8	8 1/4	16 1/2	17.80	81.00
2 15/16	8 1/4	16 1/2	18.60	84.25
3	8 1/4	16 1/2	19.40	87.50
...	...	....	.....	.....

CLEVELAND FLUTED AND ROSE CHUCKING REAMERS

TAPER SHANK

No. 134A, CARBON STEEL — **No. 632, HIGH SPEED STEEL**

FLUTED

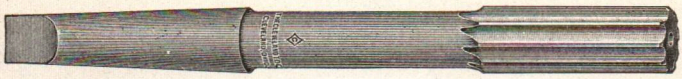


Fig. 9774A

ROSE

No. 151, CARBON STEEL — **No. 636, HIGH SPEED STEEL**

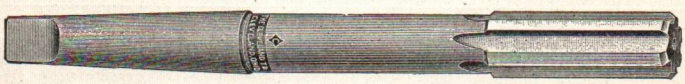


Fig. 9774B

EFFECTIVE JULY 1, 1917

Diam. Inches	Length of Flute Inches	Length Over All Inches	Price, Each — Carbon Steel	Price, Each — High Speed Steel	Diam. Inches	Length of Flute Inches	Length Over All Inches	Price, Each — Carbon Steel	Price, Each — High Speed Steel
1/4	1 1/2	6	1.45	3.50	31/32	2 5/8	10	4.15	11.00
9/32	1 1/2	6	1.55	3.75	1	2 3/4	10 1/2	4.15	11.00
5/16	1 1/2	6	1.55	3.75	1 1/32	2 3/4	10 1/2	4.45	12.25
11/32	1 1/2	6	1.75	4.25	1 1/16	2 3/4	10 1/2	4.45	12.25
3/8	1 3/4	7	1.75	4.25	1 3/32	2 3/4	10 1/2	4.70	13.50
13/32	1 3/4	7	1.90	4.75	1 1/8	2 7/8	11	4.70	13.50
7/16	1 3/4	7	1.90	4.75	1 5/32	2 7/8	11	5.00	14.75
15/32	1 3/4	7	2.15	5.25	1 3/16	2 7/8	11	5.00	14.75
1/2	2	8	2.15	5.25	1 7/32	2 7/8	11	5.20	16.25
17/32	2	8	2.40	5.75	1 1/4	3	11 1/2	5.20	16.25
9/16	2	8	2.40	5.75	1 5/16	3	11 1/2	5.50	18.00
19/32	2	8	2.70	6.25	1 3/8	3 1/4	12	5.75	19.75
5/8	2 1/4	9	2.70	6.25	1 7/16	3 1/4	12	6.05	21.50
21/32	2 1/4	9	2.90	6.75	1 1/2	3 1/2	12 1/2	6.30	23.25
11/16	2 1/4	9	2.90	6.75	1 9/16	3 1/2	12 1/2	6.60	25.00
23/32	2 1/4	9	3.05	7.25	1 5/8	3 3/4	13	6.90	26.75
3/4	2 1/2	9 1/2	3.05	7.25	1 11/16	3 3/4	13	7.20	28.50
25/32	2 1/2	9 1/2	3.35	8.00	1 3/4	4	13 1/2	7.55	30.50
13/16	2 1/2	9 1/2	3.35	8.00	1 13/16	4	13 1/2	7.90	32.50
27/32	2 1/2	9 1/2	3.60	9.00	1 7/8	4 1/4	14	8.30	34.50
7/8	2 5/8	10	3.60	9.00	1 15/16	4 1/4	14	8.65	36.75
29/32	2 5/8	10	3.90	10.00	2	4 1/4	14	9.00	39.00
15/16	2 5/8	10	3.90	10.00	...	...	....	....	.....

TAPER SHANKS HAVE MORSE TAPER AS FOLLOWS

Number	1	2	3	4	5
Diameter of Reamers, inches	1/4 to 19/32	5/8 to 29/32	15/16 to 1 7/32	1 1/4 to 1 11/16	1 3/4 to 2

High speed reamers No. 632 are not carried in stock regularly in sizes 1/2 inch and larger. Peerless high speed reamers Nos. 515 and 516 are recommended.

Reamers for brass or bronze require special clearance and are so furnished on request.

High speed reamers No. 636 are not carried in stock regularly in sizes 5/8 inch and larger. Peerless high speed reamers Nos. 517 and 518 are recommended.

All sizes and dimensions not listed are special and subject to special prices.

CLEVELAND TAPER BRIDGE REAMERS

SQUARE SHANK

No. 150, CARBON STEEL — No. 614, HIGH SPEED STEEL

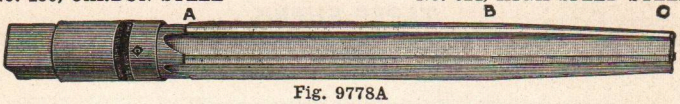


Fig. 9778A

TAPER SHANK

No. 150A, CARBON STEEL — No. 615, HIGH SPEED STEEL

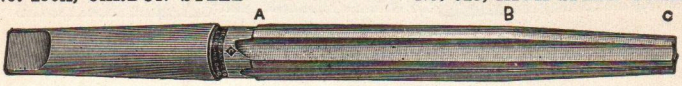


Fig. 9778B

EFFECTIVE JULY 1, 1917

SQUARE SHANK

Diameter, Inches			Length of Flute Inches	Length Over All Inches	Price, Each		Diameter, Inches			Length of Flute Inches	Length Over All Inches	Price, Each	
A	B	C			Carbon Steel	High Speed Steel	A	B	C			Carbon Steel	High Speed Steel
1/4	1/4	3/16	3 3/8	4 1/4	2.30	2.50	13/16	13/16	1/2	7 3/8	10 1/2	3.50	4.40
9/32	9/32	1/4	3 3/4	4 3/4	2.35	2.70	7/8	7/8	9/16	7 3/8	10 5/8	3.75	4.70
5/16	5/16	1/4	3 3/4	4 3/4	2.40	2.70	15/16	15/16	5/8	7 3/8	10 5/8	4.00	5.00
11/32	11/32	5/16	4	5 1/2	2.45	2.90	1	1	11/16	7 3/8	10 5/8	4.25	5.30
3/8	3/8	5/16	4	5 1/2	2.50	2.90	1 1/16	1 1/16	3/4	7 3/8	10 5/8	4.50	5.85
13/32	13/32	3/8	4 3/8	6 1/2	2.55	3.10	1 1/8	1 1/8	13/16	7 3/8	10 5/8	4.75	6.40
7/16	7/16	3/8	4 3/8	6 1/2	2.60	3.10	1 3/16	1 3/16	7/8	7 3/8	10 5/8	5.00	6.95
15/32	15/32	1/4	5 3/8	8 1/8	2.65	3.30	1 1/4	1 1/4	15/16	7 3/8	10 5/8	5.50	7.50
1/2	1/2	1/4	5 3/8	8 1/8	2.75	3.30	1 5/16	1 5/16	1	7 3/8	10 5/8	6.00	8.25
9/16	9/16	5/16	5 3/8	8 1/8	2.90	3.50	1 3/8	1 3/8	1 1/16	7 3/8	10 5/8	6.50	9.00
5/8	5/8	11/32	6 1/8	9 1/8	3.05	3.70	1 7/16	1 7/16	1 1/8	7 3/8	10 5/8	7.00	10.00
11/16	11/16	3/8	7 1/8	10 1/8	3.20	3.90	1 1/2	1 1/2	1 3/16	7 3/8	10 5/8	8.00	11.00
3/4	3/4	7/16	7 3/8	10 1/2	3.35	4.10	...	...	...	...	....	....	.....

TAPER SHANK

Diameter, Inches			Length of Flute Inches	Length Over All Inches	Price, Each		Diameter, Inches			Length of Flute Inches	Length Over All Inches	Price, Each	
A	B	C			Carbon Steel	High Speed Steel	A	B	C			Carbon Steel	High Speed Steel
1/4	1/4	3/16	3 3/8	6 3/8	2.30	3.00	13/16	13/16	1/2	7 3/8	12	3.50	5.30
9/32	9/32	1/4	3 3/4	6 3/4	2.35	3.25	7/8	7/8	9/16	7 3/8	12	3.75	5.70
5/16	5/16	1/4	3 3/4	6 3/4	2.40	3.25	15/16	15/16	5/8	7 3/8	12	4.00	6.00
11/32	11/32	5/16	4	7 1/4	2.45	3.50	1	1	11/16	7 3/8	12	4.25	6.50
3/8	3/8	5/16	4	7 1/4	2.50	3.50	1 1/16	1 1/16	3/4	7 3/8	12	4.50	7.00
13/32	13/32	3/8	4 3/8	8 1/4	2.55	3.75	1 1/8	1 1/8	13/16	7 3/8	12	4.75	7.50
7/16	7/16	3/8	4 3/8	8 1/4	2.60	3.75	1 3/16	1 3/16	7/8	7 3/8	12	5.00	8.00
15/32	15/32	1/4	5 1/8	9	2.65	4.00	1 1/4	1 1/4	15/16	7 3/8	13	5.50	8.75
1/2	1/2	1/4	5 1/8	9	2.75	4.00	1 5/16	1 5/16	1	7 3/8	13	6.00	9.50
9/16	9/16	5/16	5 1/8	9	2.90	4.25	1 3/8	1 3/8	1 1/16	7 3/8	13	6.50	10.50
5/8	5/8	11/32	6 1/8	10	3.05	4.50	1 7/16	1 7/16	1 1/8	7 3/8	13	7.00	12.00
11/16	11/16	3/8	7 1/8	11 3/4	3.20	4.75	1 1/2	1 1/2	1 3/16	7 3/8	13	8.00	14.00
3/4	3/4	7/16	7 3/8	12	3.35	5.00	...	...	...	...	..	....	.....

Shank Taper .....No.	1	2	3	4
Diameters, Inclusive.....inches	1/4 to 3/8	13/32 to 5/8	11/16 to 1 3/16	1 1/4 to 1 1/2

These reamers are especially designed for severe service and particularly adapted for use in structural iron and steel, boiler plate, etc., where precision is not required.

High speed steel reamers, No. 614, are not carried in stock regularly.

All sizes and dimensions not listed are special and subject to special prices.

CLEVELAND TAPER PIN, TAPER SOCKET AND BIT STOCK REAMERS

No. 137 STANDARD TAPER PIN REAMERS

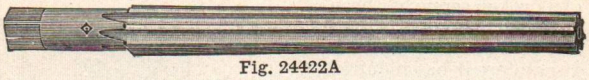


Fig. 24422A

EFFECTIVE JULY 1, 1917

Size No.	Diameter at Small End Inches	Length of Flute Inches	Length Over All Inches	Price Each	Size No.	Diameter at Small End Inches	Length of Flute Inches	Length Over All Inches	Price Each
000	.101	1 3/8	2	**1.50**	7	.331	4 1/2	6	**2.50**
00	.114	1 1/8	2 1/4	**1.35**	8	.398	5 1/4	6 3/4	**3.00**
0	.127	1 5/8	2 3/8	**1.00**	9	.482	6 1/8	8	**3.50**
1	.146	1 3/4	2 1/2	**1.00**	10	.581	7	9	**4.50**
2	.162	2	3	**1.25**	11	.706	8 1/4	11 1/4	**6.00**
3	.183	2 1/4	3 1/2	**1.50**	12	.842	10	13 3/8	**7.50**
4	.208	2 1/2	4	**1.75**	13	1.009	12	16	**9.00**
5	.240	3	4 1/2	**2.00**	14	1.250	14	18 1/4	**11.00**
6	.279	3 5/8	5	**2.25**	..	....	....	....	....

TAPER SOCKET REAMERS

No. 144 FINISHING REAMER

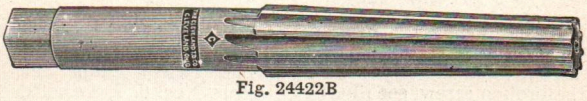


Fig. 24422B

No. 144A ROUGHING REAMER

Fig. 24422C

No. of Taper	Length of Flute Inches	Length Over All Inches	Diameter, Inches Large End	Diameter, Inches Small End	Price, Each Finishing	Price, Each Roughing
0	2 1/4	3 3/4	.367	.250	**1.60**	**1.90**
1	3	5 1/2	.517	.367	**2.00**	**2.40**
2	3 1/2	7	.745	.569	**2.60**	**3.10**
3	4 1/4	8	.988	.775	**3.40**	**4.10**
4	5 1/4	9	1.289	1.017	**4.20**	**5.05**
5	6 1/4	10	1.799	1.471	**6.60**	**7.90**
6	8 1/2	12	2.555	2.112	**12.00**	**14.40**
7	12	16	3.371	2.746	**35.00**	**42.00**

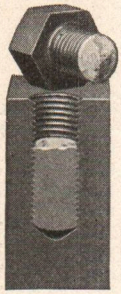
No. 137A BIT STOCK TAPER REAMERS

Fig. 24422D

Size Inches	Length of Flute Inches	Length Over All Inches	Price Each	Size Inches	Length of Flute Inches	Length Over All Inches	Price Each
1/4	1 1/8	4 1/4	**.60**	11/16	3	5 15/16	**1.10**
5/16	2	4 1/2	**.60**	3/4	3 1/8	6 1/4	**1.25**
3/8	2 1/8	4 3/4	**.65**	13/16	3 1/8	6 1/4	**1.50**
7/16	2 1/4	4 15/16	**.70**	7/8	3 1/2	6 11/16	**1.75**
1/2	2 9/16	5 5/16	**.75**	15/16	3 1/2	6 11/16	**2.00**
9/16	2 11/16	5 9/16	**.80**	1	4	7 1/4	**2.25**
5/8	2 3/4	5 11/16	**.95**	...	...	...	....

EZY-OUT SCREW EXTRACTORS

DRILL HOLE IN BROKEN SECTION



For years, the removal of a broken screw has been regarded as one of the meanest of all repair jobs. Heretofore it has required hours of aggravating labor — largely because the mechanic has never had anything but make-shift tools for the work — tools little, if at all, fitted for the task in hand. Yet, in proportion to its size, a broken screw can be one of the most expensive of breaks, for it may tie up not one machine only, but even an entire shop.

Ezy-Out Screw Extractor is the first tool designed expressly for the quick removal of broken set or cap screws, studs, pipe fittings, etc.

Instead of fussing for hours with files and punches, as in the past, merely drill a shallow hole in the broken screw, see illustration above, and insert the proper size Ezy-Out — twisting it slightly to seat it firmly.

A second twist forces Ezy-Out's corkscrew-like spirals to grip the sides of the drilled hole, and then, as additional force is brought to bear on the tap wrench, the screw will begin to come, after which it is an easy matter to spin it out on its own threads just as if it had never broken off at all.

In operation Ezy-Out is literally a "finger" which attaches itself by means of its taper spirals, to the broken screw, and, for the moment, becomes part of it, enabling you to exert a twisting force upon the broken section which would otherwise be impossible, and the tighter the screw sticks the harder will Ezy-Out grip and twist.

INSERT EZY-OUT, TWIST AND OUT COMES THE BROKEN SCREW

Made in a wide variety of sizes collected into convenient sets. They are especially designed to withstand the torsional strain to which they are subject.

EZY-OUT SCREW EXTRACTORS

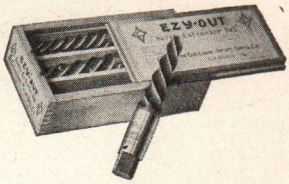


Fig. 16283A

No. 15 SET

Designed particularly for tool-room use, comprising Ezy-Out Extractors Nos. 1, 2, 3, 4 and 5.

Price.....per set **3.00**

No. 16 SET

Of particular interest to railroads, steel and structural workers, etc., known as The Heavy Shop Set, includes extractors Nos. 6, 7, 8 and 9.

Price.....per set **6 65**

No. 17 SET

Utility set for all-around use by machine shops, auto repair shops, service stations, etc. Including extractors Nos. 4, 5 and 6.

Price.....per set **2 35**

No. 192 SCREW EXTRACTORS

Size No.	Diam. Inches Small End	Diam. Inches Large End	Length of Flute Inches	Length Over All Inches	Price Each
1	1/16	1/8	1/2	2	**.55**
2	3/32	3/16	3/4	2 3/8	**.60**
3	1/8	1/4	1	2 11/16	**.65**
4	3/16	11/32	1 1/4	3	**.75**
5	1/4	7/16	1 1/2	3 3/8	**.85**
6	3/8	19/32	1 3/4	3 3/4	**1.00**
7	1/2	3/4	2	4 1/8	**1.35**
8	3/4	1 1/64	2 1/8	4 3/8	**1.85**
9	1	1 9/32	2 1/4	4 5/8	**2 65**
10	1 1/4	1 9/16	2 1/2	5	**4.00**
11	1 1/2	1 7/8	3	5 5/8	**5.35**
12	1 7/8	2 5/16	3 1/2	6 1/4	**6.65**

The best results will be obtained by using the largest Ezy-Out Screw Extractor possible for any given screw.

BROWN & SHARPE MILLING CUTTERS

1919 REVISION

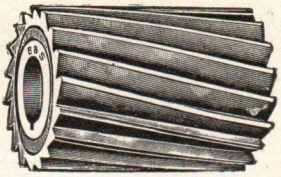


Fig. 7114A

No.	Diam. of Cutter Inches	Width of Face Inches	Size of Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	No.	Diam. of Cutter Inches	Width of Face Inches	Size of Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
M10	2¼	½	⅞	2.25	2.85	M48	2¾	1¼	1	4.35	6.10
M11	2¼	1	⅞	3.20	4.55	M49	2¾	1½	1	4.80	6.80
M12	2¼	1¾	⅞	4.20	5.80	M51	2¾	2	1	5.35	7.95
M14	2½	3/16	1	1.65	2.10	M52	2¾	2½	1	5.85	9.00
M15	2½	¼	1	1.80	2.30	M53	2¾	3	1	6.40	10.00
M16	2½	5/16	1	2.00	2.55	M55	2¾	4	1¼	7.65	12.65
M17	2½	⅜	1	2.10	2.65	M61	3	3/16	1	1.75	2.35
M18	2½	7/16	1	2.20	2.80	M62	3	¼	1	2.10	2.75
M19	2½	½	1	2.30	3.00	M63	3	5/16	1	2.35	3.20
M20	2½	9/16	1	2.40	3.20	M63A	3	⅜	1	2.70	3.55
M21	2½	⅝	1	2.45	3.45	M64	3	⅜	1¼	2.70	3.55
M22	2½	11/16	1	2.65	3.55	M65	3	7/16	1¼	2.85	3.85
M23	2½	¾	1	2.80	3.80	M66	3	½	1¼	3.10	4.10
M24	2½	13/16	1	2.90	4.00	M67	3	9/16	1¼	3.25	4.40
M25	2½	⅞	1	3.10	4.15	M68	3	⅝	1¼	3.45	4.70
M26	2½	1	1	3.30	4.55	M70	3	¾	1¼	3.85	5.20
M28	2½	1¼	1	3.70	5.15	M71	3	⅞	1¼	4.20	5.75
M29	2½	1½	1	4.00	5.65	M72	3	1	1¼	4.55	6.35
M30	2½	1¾	1	4.35	6.30	M73	3	1¼	1¼	5.10	7.20
M31	2½	2	1	4.75	6.90	M74	3	1½	1¼	5.45	7.85
M33	2½	2½	1	5.25	7.85	M75	3	1¾	1¼	5.70	8.45
M35	2½	3	1	5.70	8.80	M76	3	2	1¼	6.00	9.00
M37	2½	4	1	7.00	11.00	M77	3	2½	1¼	6.60	10.35
M38	2¾	3/16	1	1.75	2.20	M78	3	3	1¼	7.00	11.20
M39	2¾	¼	1	2.00	2.50	M79	3	3½	1¼	7.50	12.50
M40	2¾	5/16	1	2.10	2.70	M80	3	4	1¼	8.15	13.80
M41	2¾	⅜	1	2.30	2.90	M81	3	5	1¼	9.90	16.90
M42	2¾	7/16	1	2.35	3.20	M82	3	6	1¼	13.70	22.15
M43	2¾	½	1	2.40	3.30	M83	3½	3/16	1	1.85	2.65
M44	2¾	9/16	1	2.55	3.55	M84	3½	¼	1	2.20	3.10
M45	2¾	⅝	1	2.70	3.90	M85	3½	5/16	1	2.65	3.65
M45B	2¾	¾	1	3.20	4.35	M86	3½	⅜	1	3.10	4.25
M45C	2¾	⅞	1	3.65	4.95	M87	3½	7/16	1	3.50	4.40
M46	2¾	1	1	4.00	5.35	....	...	....	...	....	....

Cutters of ¾-inch face and over have teeth of a spiral form.

Cutters varying from the above list are made to order for any required size.

BROWN & SHARPE MILLING CUTTERS

1919 REVISION

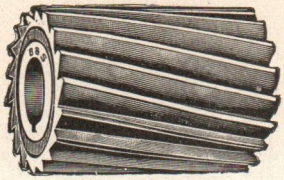


Fig. 7115A

No.	Diam. of Cutter Inches	Width of Face Inches	Size of Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	No.	Diam. of Cutter Inches	Width of Face Inches	Size of Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
M 88	3½	½	1¼	**4.00**	**5.45**	M118	4	1	1½	**7.15**	**10.25**
M 90	3½	⅝	1¼	**4.40**	**6.05**	M119	4	1¼	1¼	**7.90**	**11.60**
M 92	3½	¾	1¼	**4.90**	**6.80**	M120	4	1¼	1½	**7.90**	**11.60**
M 93	3½	⅞	1¼	**5.55**	**7.70**	M121	4	1½	1¼	**8.40**	**12.70**
M 94	3½	1	1¼	**6.10**	**8.25**	M122	4	1½	1½	**8.40**	**12.70**
M 96	3½	1½	1¼	**7.10**	**10.00**	M123	4	1¾	1¼	**9.00**	**13.70**
M 98	3½	2	1¼	**8.15**	**12.30**	M124	4	1¾	1½	**9.00**	**13.70**
M 99	3½	2½	1¼	**8.75**	**13.80**	M125	4	2	1¼	**9.45**	**14.85**
M100	3½	3	1¼	**9.40**	**15.35**	M126	4	2	1½	**9.45**	**14.85**
M101	3½	3½	1¼	**10.35**	**16.70**	M128	4	3	1¼	**11.45**	**19.10**
M102	3½	4	1¼	**11.60**	**19.30**	M128A	4	3	1½	**11.45**	**19.10**
M102A	3½	4	1½	**11.60**	**19.30**	M130	4	4	1¼	**14.00**	**23.95**
M104A	4	¼	1	**2.60**	**3.80**	M131	4	4	1½	**14.00**	**23.95**
M104B	4	5/16	1	**3.20**	**4.55**	M133	4	5	1½	**17.10**	**28.95**
M104C	4	⅜	1	**3.85**	**5.35**	M136	4	6	1½	**19.65**	**34.45**
M105	4	¼	1¼	**2.60**	**3.80**	M142	4½	½	2	**5.10**	**7.50**
M106	4	5/16	1¼	**3.20**	**4.55**	M146	4½	⅝	2	**5.60**	**8.60**
M107	4	⅜	1¼	**3.85**	**5.35**	M150	4½	¾	2	**6.10**	**9.60**
M108	4	7/16	1¼	**4.45**	**6.15**	M152	4½	⅞	2	**6.70**	**10.50**
M109	4	½	1¼	**5.00**	**6.85**	M154	4½	1	2	**7.50**	**11.55**
M111	4	9/16	1¼	**5.20**	**7.25**	M156	4½	1¼	2	**8.60**	**13.00**
M112	4	⅝	1¼	**5.45**	**7.65**	M158	4½	1½	2	**9.50**	**14.60**
M114	4	¾	1¼	**6.00**	**8.45**	M160	4½	1¾	2	**10.45**	**16.30**
M116	4	⅞	1¼	**6.55**	**9.30**	M162	4½	2	2	**10.80**	**18.00**
M117	4	1	1¼	**7.15**	**10.25**	M163	4½	6	2	**24.70**	**45.10**

Cutters of ¾-inch face and over have teeth of a spiral form.
Cutters varying from the above list are made to order in any required size.

SIDE MILLING CUTTERS WITH INSERTED TEETH

The teeth of these cutters are inserted in the periphery of the machinery steel body. They are made of either carbon tool steel, or of high speed steel; but, unless otherwise ordered, are furnished of high speed steel. The bushings, screws and teeth are interchangeable, thus allowing the teeth to be easily adjusted or removed.

Fig. 7115B

No.	Diam. Inches	Width of Face Inches	Hole Inches	Price, High Speed Steel Each	No.	Diam. Inches	Width of Face Inches	Hole Inches	Price, High Speed Steel Each
S100A	6	2	1¼	**21.50**	S102A	8	2	2	**28.25**
S101A	7	2	1¼	**24.75**	S103	9	2	1½	**32.00**
S101A	7	2	1¾	**24.75**	S104	10	2	1½	**36.00**
S102	8	2	1½	**28.25**	.....	..	..	...	.....

Other sizes made to order. Prices upon application.

BROWN & SHARPE SIDE MILLING CUTTERS

1919 REVISION

WITH SOLID TEETH

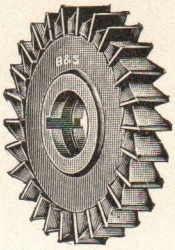


Fig. 7116A

These cutters are often used in pairs for sizing nuts, bolt heads, etc., and are then called straddle mills. They have teeth upon both sides and edges.

Cutters having dimensions other than listed are special and subject to special prices.

No.	Diam. Inches	Width of Face Inches	Hole Inches	Price, Each		No.	Diam. Inches	Width of Face Inches	Hole Inches	Price, Each	
				Carbon Steel	High Speed Steel					Carbon Steel	High Speed Steel
S10	2	3/16	1/2	2.35	2.80	S35	4	1/2	1	6.50	8.55
S11	2	1/4	1/2	2.60	3.00	S35A	4	1/2	1 1/4	6.50	8.55
S12	2	3/8	1/2	2.80	3.25	S36	4	5/8	1	7.10	9.45
S13	2	3/16	5/8	2.35	2.80	S38	4	5/8	1 1/4	7.10	9.45
S14	2	1/4	5/8	2.60	3.00	S39	4	3/4	1	7.65	10.40
S15	2	3/8	5/8	2.80	3.25	S39A	4	3/4	1 1/4	7.65	10.40
S16	2 1/2	1/4	7/8	2.80	3.30	S40	4	7/8	1	8.25	11.35
S17	2 1/2	5/16	7/8	2.90	3.60	S40A	4	7/8	1 1/4	8.25	11.35
S18	2 1/2	3/8	7/8	3.15	3.70	S40B	5	1/2	1	6.70	9.80
S19	2 1/2	7/16	7/8	3.25	3.85	S40C	5	1/2	1 1/4	6.70	9.80
S20	2 1/2	1/2	7/8	3.40	4.10	S41	5	3/4	1	8.10	12.45
S21	2 3/4	1/4	7/8	2.90	3.55	S42	5	3/4	1 1/4	8.10	12.45
S22	2 3/4	5/16	7/8	3.20	3.80	S42A	5	5/8	1	7.30	11.00
S23	2 3/4	3/8	7/8	3.40	4.00	S42B	5	5/8	1 1/4	7.30	11.00
S24	2 3/4	7/16	7/8	3.50	4.35	S43	5	7/8	1	8.75	13.65
S24A	2 3/4	7/16	1	3.50	4.35	S43A	5	7/8	1 1/4	8.75	13.65
S25	2 3/4	1/2	7/8	3.60	4.45	S44	5	1	1	9.90	15.05
S25A	2 3/4	1/2	1	3.60	4.45	S44A	5	1	1 1/4	9.90	15.05
S26	3	1/4	1	3.15	3.85	S44B	6	1/2	1	8.55	12.25
S27	3	5/16	1	3.50	4.35	S44C	6	1/2	1 1/4	8.55	12.25
S28	3	3/8	1	3.85	4.75	S44D	6	5/8	1 1/4	9.10	13.80
S29	3	7/16	1	4.10	5.10	S45	6	3/4	1	9.65	15.35
S30	3	1/2	1	4.30	5.40	S45A	6	3/4	1 1/4	9.65	15.35
S30A	3	1/2	1 1/4	4.30	5.40	S46	6	7/8	1 1/4	10.25	16.90
S31	3 1/2	7/16	1	4.80	5.75	S47	6	1	1 1/2	11.00	18.55
S32	3 1/2	1/2	1	5.35	6.95	S47A	6	1	1	11.00	18.55
S33	3 1/2	9/16	1	5.55	7.65	S47B	6	1	1 1/4	11.00	18.55
S34	3 1/2	5/8	1	5.80	7.65	S47C	7	3/4	1 1/4	17.50	23.85
S34A	4	1/4	1	3.70	5.05	S48	7	1	1 1/4	20.40	28.95
S34B	4	3/8	1	5.15	6.85	S50	8	1	1 1/4	24.75	37.30
S34C	4	3/8	1 1/4	5.15	6.85	....	....	....	....	.....	.....

We recommend that milling cutters and side milling cutters more than 8 inches in diameter be made with inserted teeth as listed on another page.

BROWN AND SHARPE ANGULAR CUTTERS

ANGULAR

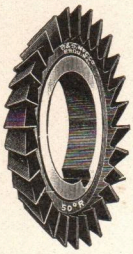


Fig. 29780A

DOUBLE

Fig. 29780B

ANGULAR

These cutters are made in 45°, 50°, 60°, 70°, and 80° angle, both right and left-hand, suitable for cutting the teeth of cutters and mills.

No.	Diam. Inches	Thickness Inches	Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
J10	2½	½	⅞	**3.40**	**4.10**
J11	2¾	½	1	**3.60**	**4.45**
J12	3	½	1¼	**4.30**	**5.40**

DOUBLE ANGLE

These cutters are made wtih 45°, 60°, or 90°, including angle.

No.	Diam. Inches	Thickness Inches	Size of Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
J100	2½	½	⅞	**4.70**	**5.40**
J101	2¾	½	1	**5.20**	**6.05**
J102	3	½	1¼	**6.15**	**7.25**

V shaped cutters of any angle made to order.

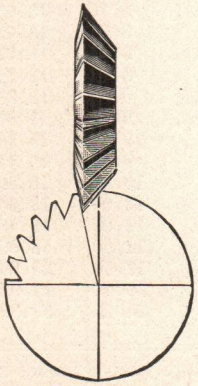


Fig. 29780C

FOR SPIRAL MILLS

These cutters are especially adapted to the cutting of spiral mills, either 40°, 48° or 53° angle on one side and 12° on the other. They are right-hand cutters. The illustration shows the cutter at work in the position required in cutting the teeth of a spiral mill.

No.	Diam. Inches	Thickness Inches	Size of Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
J150	2½	½	⅞	**3.40**	**4.10**
J151	2¾	½	1	**3.60**	**4.45**
J152	3	½	1¼	**4.30**	**5.40**
*J153	3¼	½	1½	**4.80**	**6.15**

*Furnished 53° on one side and 12° on the other.

BROWN & SHARPE PATENT INVOLUTE CUTTERS

FOR TEETH OF GEAR WHEELS

1919 REVISION

These gear cutters are furnished, from 2 to 8 pitch, inclusive, of half numbers, for the accommodation of those who require a finer division of the number of teeth to be cut with each cutter than can be cut with the regular number.

REGULAR NUMBERS

EIGHT CUTTERS FOR EACH PITCH

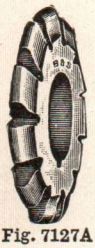


Fig. 7127A

Number..	1	2	3	4	5	6	7	8
Range...	135 to a Rack	55 to 134	35 to 54	26 to 34	21 to 25	17 to 20	14 to 16	12 to 13

HALF NUMBERS

Number.....	1½	2½	3½	4½	5½	6½	7½
Range.....teeth	80 to 134	42 to 54	30 to 34	23 to 25	19 to 20	15 to 16	13

In ordering, give the number of cutter and diametral pitch required.

INVOLUTE CUTTERS

Pitch	Diameter of Cutter, Inches		Size of Hole Inches	Price, Each		Pitch	Diameter of Cutter, Inches		Size of Hole Inches	Price, Each	
	Carbon Steel	High Speed Steel		Carbon Steel	High Speed Steel		Carbon Steel	High Speed Steel		Carbon Steel	High Speed Steel
*1	8½	8½	2	**57.00**	**85.00**	12	2⅛	2¼	⅞	**3.90**	**4.25**
*1¼	7¾	7¾	2	**48.00**	**70.00**	14	2	2⅛	⅞	**3.40**	**3.75**
*1½	7	7	1¾	**40.50**	**55.00**	16	2	2⅛	⅞	**3.20**	**3.50**
1¾	6½	6½	1¾	**30.35**	**45.00**	18	1⅞	2	⅞	**3.00**	**3.40**
2	5¾	5¾	1½	**20.25**	**35.00**	20	1⅞	2	⅞	**2.90**	**3.30**
2½	5½	5¾	1½	**13.90**	**23.00**	22	1⅞	2	⅞	**2.80**	**3.20**
3	4⅜	4¾	1¼	**10.10**	**18.00**	24	1¾	1¾	⅞	**2.65**	**3.10**
4	3⅞	4¼	1¼	**7.60**	**12.00**	26	1¾	1¾	⅞	**2.55**	**3.00**
5	3⅝	3¾	1¼	**6.35**	**10.00**	28	1¾	1¾	⅞	**2.25**	**3.00**
6	3	3⅛	1	**5.45**	**8.00**	30	1¾	1¾	⅞	**2.25**	**3.00**
7	2⅞	2⅞	1	**5.15**	**7.00**	32	1¾	1¾	⅞	**2.25**	**3.00**
8	2⅞	2⅞	1	**5.00**	**6.00**	36	1¾	1¾	⅞	**2.25**	**3.00**
9	2¾	2¾	1	**4.70**	**5.50**	40	1¾	1¾	⅞	**2.25**	**3.00**
10	2¼	2⅜	⅞	**4.45**	**5.00**	48	1¾	1¾	⅞	**2.25**	**3.00**
11	2¼	2⅜	⅞	**4.20**	**4.50**	..	...	...	..	....	**3.00**

Cutters marked * are not kept in stock, but are made to order.
All gears of same pitch cut with these cutters are interchangeable.

BROWN & SHARPE CUTTERS

1919 REVISION

FOR GROOVING TAPS AND REAMERS

Fig. 7123A

FOR GROOVING TAPS

Fig. 7123B

FOR GROOVING TAPS AND REAMERS

Style No.	Cutter No.	Diam. of Tap Inches	Number of Teeth Inches	Diam. of Cutter Inches	Hole in Cutter in Tap	Price, Each Carbon Steel	Price, Each High Speed Steel
L10	1	0 to 1/8	4	2	1	2.10	3.15
L11	2	5/32 " 1/4	4	2	1	2.45	3.70
L12	3	9/32 " 3/8	4	2 1/8	1	3.35	5.10
L13	4	7/16 " 5/8	4	2 1/4	1	3.60	5.45
L14	5	11/16 " 7/8	4	2 3/8	1	4.15	6.30
L15	6	15/16 " 1 1/4	4	2 1/2	1	4.70	7.10
L16	7	1 5/16 " 1 5/8	4	2 5/8	1	5.85	8.85
L17	8	1 11/16 "2	4	2 7/8	1	6.75	10.25

No. L10 cutter is suitable for grooving taps 1/8 inch or less in diameter, No. L11 for taps larger than 1/8 inch and up to 1/4 inch in diameter, etc.

FOR GROOVING REAMERS

L10	1	1/8 to 1/4	*6	2	1	2.10	3.15
L11	2	9/32 " 3/8	*6	2	1	2.45	3.70
L12	3	13/32 " 1/2	*6	2 1/8	1	3.35	5.10
L13	4	17/32 " 1 1/8	*6 to 8	2 1/4	1	3.60	5.45
L14	5	1 5/32 " 1 3/4	*8 " 10	2 3/8	1	4.15	6.30
L15	6	1 25/32 " 2	*10	2 1/2	1	4.70	7.10
L16	7	2 1/16 " 2 1/2	*10	2 5/8	1	5.85	8.85
L17	8	2 9/16 " 3	*10	2 7/8	1	6.75	10.20

*Number of teeth in reamer.

FOR GROOVING TAPS

Style No.	Cutter No.	Diam. of Tap Inches	Diam. of Cutter Inches	Hole in Cutter Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Style No.	Cutter No.	Diam. of Tap Inches	Diam. of Cutter Inches	Hole in Cutter Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
L50	1	0 to 1/8	2	1	2.10	3.15	L55	6	15/16 to 1 1/4	2 1/2	1	4.70	7.10
L51	2	5/32 " 1/4	2	1	2.45	3.70	L56	7	1 5/16 " 1 5/8	2 5/8	1	5.85	8.85
L52	3	9/32 " 3/8	2 1/8	1	3.35	5.10	L57	8	1 11/16 " 2	2 7/8	1	6.55	9.90
L53	4	7/16 " 5/8	2 1/4	1	3.60	5.45	L58	9	2 1/16 " 2 7/16	3 1/8	1	8.10	12.25
L54	5	11/16 " 7/8	2 3/8	1	4.15	6.30	L59	10	2 1/2 " 3	3 3/8	1	9.35	14.45

FOR FLUTING REAMERS

Style No.	Cutter No.	Diam. of Reamer Inches	Number of Teeth	Hole in Cutter Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Style No.	Cutter No.	Diam. of Reamer Inches	Number of Teeth	Hole in Cutter Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
L75	1	1/8 to 3/16	6	1	2.45	3.70	L80	6	1 1/16 to 1 1/2	10	1	3.90	5.85
L76	2	1/4 " 5/16	6	1	3.10	4.75	L81	7	1 9/16 " 2 1/8	12	1	4.30	6.65
L77	3	3/8 " 7/16	6	1	3.35	5.00	L82	8	2 1/4 " 3	14	1	4.80	7.30
L78	4	1/2 " 11/16	6 to 8	1	3.60	5.45	L83	9	3 1/16 " 3 1/2	14	1	5.90	9.00
L79	5	3/4 "1	8	1	3.80	5.70	L84	10	3 9/16 " 5	14 to 16	1	7.00	10.50

All the above cutters can be sharpened by grinding without changing their form.

BROWN AND SHARPE IMPROVED STOCKING CUTTERS AND SCREW SLOTTING CUTTER ARBORS

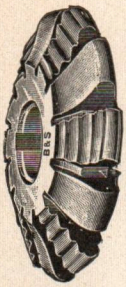


Fig. 30095A

IMPROVED STOCKING CUTTERS FOR INVOLUTE GEARS

1919 REVISION

By the use of these cutters, heavy cuts at fast speeds and coarse feeds can be taken because of the easier cutting action produced.

The greater part of the cutting is performed by the plain teeth, the stepped teeth projecting beyond the outline of the plain teeth only enough to break up the chips.

Because of the smooth and easy cutting action a minimum amount of power is consumed in driving the machine.

	Diameter of Cutter Inches			Price, per Cutter	
Diam. Pitch	Carbon Steel	High Speed Steel	Hole Inches	Carbon Steel	High Speed Steel
1	8½	8½	2	**177.00**	**205.00**
1¼	7¾	7¾	2	**133.88**	**155.88**
1½	7	7	1¾	**98.88**	**113.38**
1¾	6½	6½	1¾	**73.98**	**88.63**
2	5¾	5¾	1½	**51.25**	**66.00**
2½	5½	5¾	1½	**42.03**	**51.13**
3	4⅜	4¾	1¼	**26.85**	**34.75**
4	3⅞	4¼	1¼	**17.23**	**21.63**
5	3⅝	3¾	1¼	**14.10**	**17.75**
6	3	3⅛	1	**10.45**	**13.00**
7	2⅞	2⅞	1	**8.90**	**10.75**
8	2⅞	2⅞	1	**8.00**	**9.00**

*Made to order.

SCREW SLOTTING CUTTER ARBORS

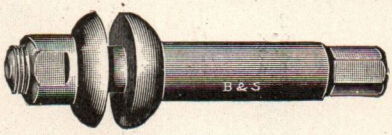


Fig. 30095B

These arbors are for use with screw slotting cutters and are adapted for use on centres. They are also made with the No. 7 taper shank for use on the screw slotting machine. The following sizes are carried in stock at factory: ⅜, ½, ⅝, ¾, ⅞ and 1-inch.

Price.....each **5.00**

BROWN & SHARPE CONVEX AND CONCAVE CUTTERS

1919 REVISION

FOR MILLING HALF CIRCLES

CONVEX

Fig. 7125A

CONCAVE

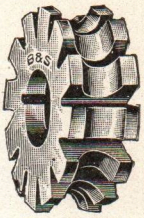


Fig. 7125B

CONVEX

No.	Diam. of Circle Inches	Diam. of Cutter Inches	Size of Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
C10	1/8	2	7/8	2.10	3.15
C11	3/16	2	7/8	2.45	3.70
C12	1/4	2	7/8	3.10	4.75
C13	5/16	2 1/4	7/8	3.35	5.10
C14	3/8	2 1/4	7/8	3.45	5.25
C15	7/16	2 1/4	7/8	3.60	5.45
C16	1/2	2 1/4	7/8	3.80	5.70
C17	5/8	2 3/4	1	4.65	7.00
C18	3/4	3	1	5.50	8.35
C19	7/8	3 1/4	1	6.45	9.75
C20	1	3 1/4	1	7.00	10.50
C21	1 1/8	4	1 1/4	9.35	14.20
C22	1 1/4	4	1 1/4	9.65	14.65
C23	1 3/8	4 1/4	1 1/4	10.70	16.20
C24	1 1/2	4 1/4	1 1/4	11.00	16.75

CONCAVE

No.	Diam. of Circle Inches	Diam. of Cutter Inches	Size of Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
C10A	1/8	2	7/8	3.35	5.00
C11A	3/16	2	7/8	3.50	5.35
C12A	1/4	2	7/8	3.80	5.70
C13A	5/16	2 1/4	7/8	4.10	6.20
C14A	3/8	2 1/4	7/8	4.25	6.40
C15A	7/16	2 1/4	7/8	4.50	6.85
C16A	1/2	2 1/4	7/8	4.80	7.30
C17A	5/8	2 3/4	1	6.00	9.00
C18A	3/4	3	1	7.00	10.60
C19A	7/8	3 1/4	1	8.00	12.10
C20A	1	3 1/4	1	8.15	12.40
C21A	1 1/8	4	1 1/4	10.80	16.35
C22A	1 1/4	4	1 1/4	11.40	17.25
C23A	1 3/8	4 1/4	1 1/4	12.85	19.55
C24A	1 1/2	4 1/4	1 1/4	13.90	21.10

These cutters can be sharpened by grinding without changing their form.

BROWN & SHARPE END MILLS

1919 REVISION

B. & S. TAPER SHANK

STRAIGHT FLUTE

Fig. 7117A

SPIRAL FLUTE

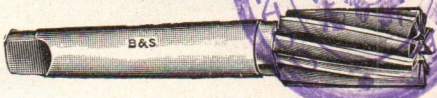


Fig. 7117B

CONSEJO DE MINERIA

STRAIGHT FLUTE

Number	Diam. Inches	No. of Taper	Length of Cut Inches	Whole Length Inches	Price, Each: Carbon Steel	Price, Each: High Speed Steel	Number	Diam. Inches	No. of Taper	Length of Cut Inches	Whole Length Inches	Price, Each: Carbon Steel	Price, Each: High Speed Steel
E 10	1/4	4	13/16	2 7/16	1.25	1.40	E 24	11/16	7	1 1/2	5 1/2	2.20	2.85
E 11	1/4	5	13/16	3	1.45	1.70	E 26	3/4	7	1 5/8	5 5/8	2.25	2.95
E 12	5/16	4	7/8	2 1/2	1.25	1.40	E 27	3/4	9	1 5/8	6 7/8	2.50	3.85
E 13	5/16	5	7/8	3 1/16	1.45	1.70	E30	7/8	7	1 3/4	5 3/4	2.65	3.55
E 14	3/8	4	7/8	2 1/2	1.40	1.55	E31	7/8	9	1 3/4	7	2.85	4.25
E 15	3/8	5	7/8	3 1/16	1.55	1.75	E34	1	7	1 7/8	5 7/8	2.70	3.80
E 16	7/16	4	15/16	2 9/16	1.40	1.55	E35	1	9	1 7/8	7 1/8	2.90	4 35
E 17	7/16	5	15/16	3 1/8	1.60	1.80	E38	1 1/8	7	2	6	2.85	4.20
E 18	1/2	5	1	3 3/16	1.65	1.90	E39	1 1/8	9	2	7 1/4	3.00	4.60
E 19	1/2	7	1 1/8	5 1/8	1.80	2.40	E42	1 1/4	7	2	6	2.85	4.45
E 20	9/16	5	1 1/16	3 1/4	1.70	2.00	E43	1 1/4	9	2	7 1/4	3.25	5.10
E 21	9/16	7	1 1/4	5 1/4	2.00	2.50	E45	1 3/8	9	2 1/8	7 3/8	3.45	6.25
E 22	5/8	5	1 1/4	3 7/16	1.80	2.20	E47	1 1/2	9	2 1/4	7 1/2	3.80	6.85
E 23	5/8	7	1 1/2	5 1/2	2.15	2 80	....	....	....	....	....	....	....

SPIRAL FLUTE

E100	1/4	4	13/16	2 7/16	1.25	1.40	E115	11/16	9	1 1/2	6 3/4	2.40	3.75
E101	1/4	5	13/16	3	1.45	1.70	E116	3/4	7	1 5/8	5 5/8	2.25	2.95
E102	5/16	4	7/8	2 1/2	1.25	1.40	E117	3/4	9	1 5/8	6 7/8	2.50	3.85
E103	5/16	5	7/8	3 1/16	1.45	1.70	E120	7/8	7	1 3/4	5 3/4	2.65	3.55
E104	3/8	4	7/8	2 1/2	1.40	1.55	E121	7/8	9	1 3/4	7	2.85	4.25
E105	3/8	5	7/8	3 1/16	1.55	1.75	E124	1	7	1 7/8	5 7/8	2.70	3.80
E106	7/16	4	15/16	2 9/16	1.40	1.55	E125	1	9	1 7/8	7 1/8	2.90	4.35
E107	7/16	5	15/16	3 1/8	1.60	1.80	E128	1 1/8	7	2	6	2.85	4.20
E108	1/2	5	1	3 3/16	1.65	1.90	E129	1 1/8	9	2	7 1/4	3.00	4.60
E109	1/2	7	1 1/8	5 1/8	1.80	2.40	E132	1 1/4	7	2	6	2.85	4.45
E110	9/16	5	1 1/16	3 1/4	1.70	2.00	E133	1 1/4	9	2	7 1/4	3.25	5.10
E111	9/16	7	1 1/4	5 1/4	2.00	2.50	E135	1 3/8	9	2 1/8	7 3/8	3.45	6.25
E112	5/8	5	1 1/4	3 7/16	1.80	2.20	E137	1 1/2	9	2 1/4	7 1/2	3.80	6.85
E113	5/8	7	1 1/2	5 1/2	2.15	2.80	E138	1 5/8	9	2 3/8	7 5/8	4.15	7.45
E114	11/16	7	1 1/2	5 1/2	2.20	2.85	E139	1 3/4	9	2 1/2	7 3/4	4.45	8.30

In ordering, state whether right or left-hand mills are wanted.

No. 4 taper fits A and J collets; No. 5, C, D, EE, K, N and R collets; No. 7 BB, DD, KK, E, Q, RR and Z collets; No. 9, F, G, H, O, SS and T collets.

BROWN & SHARPE MILLS

1919 REVISION

MORSE TAPER SHANK

END

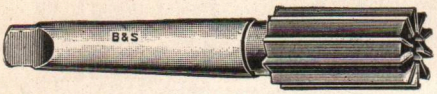


Fig. 9731A

SPIRAL END

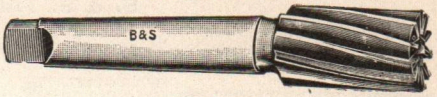


Fig. 9731B

END

No.	Diam. Inches	No. of Taper	Length of Cut Inches	Whole Length Inches	Price, Each — Carbon Steel	Price, Each — High Speed Steel
E-300	1/4	1	13/16	3 5/8	1.45	1.70
E-301	5/16	1	7/8	3 11/16	1.45	1.70
E-302	3/8	1	7/8	3 11/16	1.55	1.75
E-303	7/16	1	15/16	3 3/4	1.60	1.85
E-304	7/16	2	1	4 1/2	1.75	2.25
E-305	1/2	1	1	3 13/16	1.65	1.90
E-306	1/2	2	1 1/8	4 5/8	1.80	2.30
E-307	9/16	1	1 1/16	3 7/8	1.70	2.00
E-308	9/16	2	1 1/4	4 3/4	2.00	2.40
E-309	5/8	2	1 1/2	5	2.00	2.50
E-310	11/16	2	1 1/2	5	2.20	2.75
E-311	3/4	2	1 5/8	5 1/8	2.25	2.85
E-312	3/4	3	1 5/8	5 15/16	2.50	3.45
E-315	7/8	2	1 3/4	5 1/4	2.65	3.40
E-316	7/8	3	1 3/4	6 1/16	2.85	3.75
E-319	1	2	1 7/8	5 3/8	2.70	3.60
E-320	1	3	1 7/8	6 3/16	2.90	4.00
E-323	1 1/8	3	2	6 5/16	3.00	4.25
E-325	1 1/4	3	2	6 5/16	3.10	4.65

SPIRAL END

No.	Diam. Inches	No. of Taper	Length of Cut Inches	Whole Length Inches	Carbon Steel	High Speed Steel
E-395	1/4	1	13/16	3 5/8	1.45	1.70
E-396	5/16	1	7/8	3 11/16	1.45	1.70
E-397	3/8	1	7/8	3 11/16	1.55	1.75
E-398	7/16	1	15/16	3 3/4	1.60	1.85
E-399	7/16	2	1	4 1/2	1.75	2.25
E-400	1/2	1	1	3 13/16	1.65	1.90
E-401	1/2	2	1 1/8	4 5/8	1.80	2.30
E-402	9/16	1	1 1/16	3 7/8	1.70	2.00
E-403	9/16	2	1 1/4	4 3/4	2.00	2.40
E-404	5/8	2	1 1/2	5	2.00	2.50
E-405	11/16	2	1 1/2	5	2.20	2.75
E-406	3/4	2	1 5/8	5 1/8	2.25	2.85
E-407	3/4	3	1 5/8	5 15/16	2.50	3.45
E-410	7/8	2	1 3/4	5 1/4	2.65	3.40
E-411	7/8	3	1 3/4	6 1/16	2.85	3.75
E-414	1	2	1 7/8	5 3/8	2.70	3.60
E-415	1	3	1 7/8	6 3/16	2.90	4.00
E-418	1 1/8	3	2	6 5/16	3.00	4.25
E-420	1 1/4	3	2	6 5/16	3.10	4.65
E-421	1 1/4	4	2	7 3/8	3.25	5.00
E-424	1 3/8	3	2 1/8	6 7/16	3.35	5.20
E-425	1 3/8	4	2 1/8	7 1/2	3.45	5.60
E-428	1 1/2	3	2 1/4	6 9/16	3.45	5.65
E-429	1 1/2	4	2 1/4	7 5/8	3.80	6.25

In ordering state whether right or left-hand mills are wanted.

BROWN & SHARPE SCREW SLOTTING CUTTERS

1919 REVISION

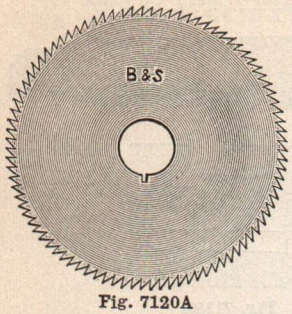


Fig. 7120A

Cutters 2¾-inch diameter have 72 teeth, 2¼-inch, 60 teeth and 1¾-inch, 90 teeth.

These cutters have a fine pitch of teeth especially adapted for the slotting of screw heads and similar work. They are not ground on the sides.

Number	Diam. of Screw Head to be Slotted, Inches	Thickness Amer. Stand. Gauge	Thickness in Decimals	Diam. Inches	Size of Hole Inches	Price Each	Number	Diam. of Screw Head to be Slotted Inches	Thickness Amer. Stand. Gauge	Thickness in Decimals	Diam. Inches	Size of Hole Inches	Price Each
H10	1 5/16	5	.182	2¾	1	.90	H36H	....	17	.045	2¼	⅝	.20
H11	1⅛	6	.162	2¾	1	.75	H36I	....	18	.040	2¼	⅝	.20
H12	1	7	.144	2¾	1	.65	H36J	....	19	.035	2¼	⅝	.20
H13	⅞	8	.128	2¾	¾, 1	.55	H37	3/16	20	.032	2¼	⅝	.20
H14	¾-13/16	9	.114	2¾	¾, 1	.50	H38	⅛	21	.028	2¼	⅝	.20
H15	⅝	10	.102	2¾	¾, 1	.45	H39	....	22	.025	2¼	⅝	.20
H16	....	11	.091	2¾	¾, 1	.40	H40	....	23	.023	2¼	⅝	.20
H17	½-9/16	12	.081	2¾	¾, 1	.35	H41	....	24	.020	2¼	⅝	.20
H18	....	13	.072	2¾	¾, 1	.30	H42	....	25	.018	2¼	⅝	.20
H19	⅜-7/16	14	.064	2¾	½, ⅝, ¾, 1	.30	H43	....	26	.016	2¼	⅝	.20
H20	11/32	15	.057	2¾	½, ⅝, ¾, 1	.20	H44	....	27	.014	2¼	⅝	.20
H21	5/16	16	.051	2¾	½, ⅝, ¾, 1	.20	H45	....	28	.012	2¼	⅝	.20
H22	....	17	.045	2¾	½, ⅝, ¾, 1	.20	H46	....	30	.010	2¼	⅝	.20
H23	¼-9/32	18	.040	2¾	½, ⅝, ¾, 1	.20	H47	....	32	.008	2¼	⅝	.20
H24	3/16-7/32	19	.035	2¾	½, ⅝, ¾, 1	.20	H48	....	34	.006	2¼	⅝	.20
H25	....	20	.032	2¾	½, ⅝, ¾, 1	.20	H49	⅜	14	.064	1¾	⅝	.20
H26	⅛	21	.028	2¾	½, ⅝, ¾, 1	.20	H50	11/32	15	.057	1¾	⅝	.20
H27	⅛	22	.025	2¾	½, ⅝, ¾, 1	.20	H51	5/16	16	.051	1¾	⅝	.20
H28	....	23	.023	2¾	½, ⅝, ¾, 1	.20	H52	9/32	17	.045	1¾	⅝	.20
H29	....	24	.020	2¾	½, ⅝, ¾, 1	.20	H53	¼	18	.040	1¾	⅝	.20
H30	....	25	.018	2¾	½, ⅝, ¾, 1	.20	H54	7/32	19	.035	1¾	⅝	.20
H31	....	26	.016	2¾	¾, 1	.20	H55	3/16	20	.032	1¾	⅝	.20
H32	....	27	.014	2¾	¾, 1	.20	H56	⅛	21	.028	1¾	⅝	.20
H33	....	28	.012	2¾	¾, 1	.20	H57	....	22	.025	1¾	⅝	.20
H34	....	30	.010	2¾	¾, 1	.20	H58	....	23	.023	1¾	⅝	.20
H35	....	32	.008	2¾	¾, 1	.20	H59	....	24	.020	1¾	½, ⅝	.15
H36	....	34	.006	2¾	¾, 1	.20	H60	....	25	.018	1¾	½, ⅝	.15
H36A	....	10	.102	2¼	⅝	.40	H61	....	26	.016	1¾	½, ⅝	.15
H36B	....	11	.091	2¼	⅝	.35	H62	....	27	.014	1¾	½, ⅝	.15
H36C	....	12	.081	2¼	⅝	.30	H63	....	28	.012	1¾	½, ⅝	.15
H36D	....	13	.072	2¼	⅝	.20	H64	....	30	.010	1¾	½, ⅝	.15
H36E	....	14	.064	2¼	⅝	.20	H65	....	32	.008	1¾	½, ⅝	.15
H36F	....	15	.057	2¼	⅝	.20	H66	....	34	.006	1¾	½, ⅝	.15
H36G	....	16	.051	2¼	⅝	.20	....	....	..	....	...	.....	...

Cutters varying from the above list are made to order.

BROWN & SHARPE METAL SLITTING SAWS, ETC.

1919 REVISION

METAL SLITTING SAW

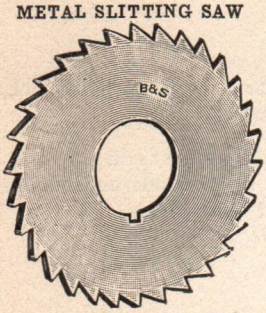


Fig. 7119A

STANDARD T SLOT CUTTER
LEFT-HAND CUTTER

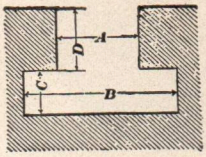


Fig. 7119B

METAL SLITTING SAWS

No.	Diam. Inches	Thickness Inches	Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	No.	Diam. Inches	Thickness Inches	Hole Inches	Price, Each Carbon Steel	Price, Each High Speed Steel
G50	2½	1/32	7/8	1.30	2.50	G71	5	1/8	1	2.00	3.35
G51	2½	3/64	7/8	1.20	2.40	G72	5	1/8	1¼	2.00	3.35
G52	2½	1/16	7/8	1.15	2.35	G73	5	1/8	1½	2.00	3.35
G53	2½	3/32	7/8	1.15	2.35	G74	5	5/32	1	2.45	4.30
G54	2½	1/8	7/8	1.15	2.35	G75	5	3/16	1	2.90	4.30
G55	2½	5/32	7/8	1.40	2.60	G76	6	1/16	1	5.10	7.50
G56	3	1/32	1	1.60	2.95	G77	6	3/32	1	3.85	5.85
G57	3	3/64	1	1.45	2.60	G78	6	1/8	1	3.45	5.35
G58	3	1/16	1	1.30	2.50	G78A	6	1/8	1¼	3.45	5.35
G59	3	3/32	1	1.30	2.50	G79	6	3/16	1	4.45	6.45
G60	3	1/8	1	1.30	2.50	G80	6	3/16	1½	4.45	6.45
G61	3	5/32	1	1.50	2.85	G81	7	1/16	1	9.50	11.00
G62	4	1/32	1	2.85	4.60	G82	7	3/32	1	5.70	8.35
G63	4	3/64	1	1.85	3.15	G83	7	1/8	1	4.85	7.20
G64	4	1/16	1	1.60	2.95	G83A	7	3/16	1¼	6.50	9.05
G65	4	3/32	1	1.55	2.85	G83C	7	3/16	2	6.50	9.05
G66	4	1/8	1	1.55	2.85	G84	8	1/8	1	7.30	12.00
G67	4	5/32	1	1.80	3.45	G85	8	1/8	1¼	7.30	12.00
G68	4	3/16	1	2.10	3.45	G86	8	3/16	1¼	8.90	12.30
G69	5	1/16	1	2.30	3.85	G87	8	3/16	1½	8.90	12.30
G70	5	3/32	1	2.00	3.35	.....	..	.....	.....	.....	.....

In ordering special saws, please state for what purpose they are required.

STANDARD T SLOT CUTTERS

These cutters are made 1/32 inch larger in diameter and 1/64 inch greater in thickness than the figures given, to allow for sharpening. Other sizes made to order.

No. of Cutter	Width of Slot A Inches	Diam. of Neck of Cutter Inches	Width of Slot B, In.	Depth C Inches	Extreme Limit, D, In.	No. of Taper	Price, Each Carbon Steel	Price, Each High Speed Steel	No. of Cutter	Width of Slot A, In.	Diam. of Neck of Cutter Inches	Width of Slot B, In.	Depth C Inches	Extreme Limit, D, In.	No. of Taper	Price, Each Carbon Steel	Price, Each High Speed Steel
4	1/4	7/32	1/2	5/32	5/16	4	2.00	2.10	22	7/16	3/8	13/16	7/32	7/16	7	3.00	3.65
7	1/4	7/32	1/2	5/32	5/16	5	2.10	2.25	28	1/2	7/16	15/16	9/32	9/16	7	3.30	4.15
10	5/16	9/32	5/8	5/32	3/8	5	2.20	2.60	31	1/2	7/16	15/16	9/32	9/16	9	3.50	4.80
13	5/16	9/32	5/8	5/32	3/8	7	2.65	3.25	34	5/8	17/32	1 3/16	13/32	3/4	9	3.90	5.55
16	3/8	11/32	11/16	7/32	7/16	5	2.55	2.90	37	3/4	21/32	1 5/16	17/32	1	9	4.35	6.35
19	3/8	11/32	11/16	7/32	7/16	7	2.80	3.35	40	7/8	25/32	1 5/8	11/16	1 1/16	9	4.75	7.75

In ordering, state whether right or left-hand cutters are wanted.

G. T. D. TAPS

EFFECTIVE JULY 1, 1918

Nos. 300 AND 302 MACHINISTS' HAND TAPS

TAPER

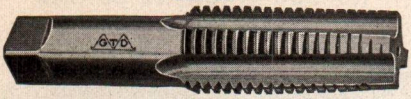


Fig. 4490A

PLUG

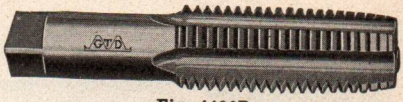


Fig. 4490B

BOTTOMING

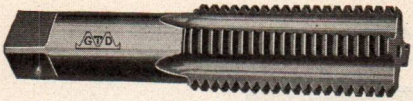


Fig. 4490C

United States Standard form of thread furnished unless otherwise specified. Sizes, lengths and threads not listed are subject to special prices. Left-hand taps are special.

No. 300, UNDER 1/4-INCH

Diam. of Tap Inches	No. of Threads to Inch: Stand. Pitches U.S.	Whitworth	U. S. Form Threads Also Furnished	Length Over All Inches	Price: Each	Per Set
1/16	64	60	72	1 5/8	.50	1.50
5/64	60	..	72	1 45/64	.45	1.35
3/32	50	48	48	1 51/64	.40	1.20
7/64	48	..	..	1 7/8	.40	1.20
1/8	40	40	32	1 31/32	.35	1.05
9/64	40	..	..	2 3/64	.35	1.05
5/32	36	32	32		.35	1.05
11/64	32	..	..		.35	1.05
3/16	24	24	32		.40	1.20
13/64	24	..	..		.40	1.20
7/32	24	24	32		.45	1.35
15/64	24	..	..		.45	1.35

No. 302, 1/4-INCH AND LARGER

Number of Threads to the Inch

Diam. of Tap Inches	Standard Pitches: U.S. Std.	Whitworth Std.	V Form	Other Pitches Also Furnished U.S. Form	Price: Each	Per Set
1/4	20	20	20	24, 27, 32	.45	1.35
5/16	18	18	18	20, 27, 32	.50	1.50
3/8	16	16	16	20, 27	.55	1.65
7/16	14	14	14	24, 27	.60	1.80
1/2	13	12	12	12, 24, 27	.70	2.10
9/16	12	12	12	27	.80	2.40
5/8	11	11	11	12, 27	.90	2.70
11/16	11	11	..	..	1.05	3.15
3/4	10	10	10	12, 27	1.20	3.60
13/16	10	10	..	..	1.40	4.20
7/8	9	9	9	12, 27	1.60	4.80
15/16	9	9	..	..	1.80	5.40
1	8	8	8	12, 27	2.00	6.00
1 1/8	7	7	..	..	2.25	6.75
1 1/4	7	7	..	..	2.60	7.80
1 3/8	6	6	..	..	3.00	9.00
1 1/2	6	6	..	..	3.50	10.50
1 5/8	5 1/2	5	..	..	4.20	12.60
1 3/4	5	5	..	..	5.00	15.00
1 7/8	5	4 1/2	..	..	5.80	17.40
2	4 1/2	4 1/2	..	..	6.70	20.10
2 1/8	4 1/2	4 1/2	..	..	8.00	24.00
2 1/4	4 1/2	4	..	..	9.20	27.60
2 3/8	4	4	..	..	10.50	31.50
2 1/2	4	4	..	..	11.50	34.50

G. T. D. TAPS

EFFECTIVE JULY 1, 1918

No. 302 HAND

S. A. E. STANDARD

TAPER

Fig. 8869A

PLUG

Fig. 8869B

BOTTOMING

Fig. 8869C

Orders for hand taps to and including $\frac{11}{32}$-inch will be filled with taps having shanks full diameter of thread. Taps $\frac{3}{8}$ inch and larger will be furnished with shanks size of bottom of thread. $\frac{3}{8}$-inch hand taps with shanks size of bottom of thread furnished at regular prices. Sizes, lengths and threads not listed are subject to special prices. Left-hand taps are special.

Diam. Top Inches	No. of Threads to Inch	Price Each	Price Per Set
$\frac{1}{4}$	28	.45	1.35
$\frac{5}{16}$	24	.50	1.50
$\frac{3}{8}$	24	.55	1.65
$\frac{7}{16}$	20	.60	1.80
$\frac{1}{2}$	20	.70	2.10
$\frac{9}{16}$	18	.80	2.40
$\frac{5}{8}$	18	.90	2.70
$\frac{11}{16}$	16	1.05	3.15
$\frac{3}{4}$	16	1.20	3.60
$\frac{7}{8}$	14–18*	1.60	4.80
1	14	2.00	6.00
$1\frac{1}{8}$	12	2.25	6.75
$1\frac{1}{4}$	12	2.60	7.80
$1\frac{3}{8}$	12	3.00	9.00
$1\frac{1}{2}$	12	3.50	10.50

*Standard spark plug size.

No. 305 MACHINE SCREW

A. S. M. E. STANDARD

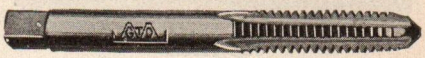


Fig. 8869D

The adoption of this standard is recommended. When so ordered, the taps will be furnished in sets of taper, plug and bottoming like hand taps.

Plug taps furnished unless otherwise specified.

Sizes, lengths and threads not listed are subject to special prices.

Left-hand taps are special.

Screw Gauge No.	No. of Threads to Inch Std.	Also Furnished	Price Each	Price Per Dozen
0	80	..	.50	6.00
1	72	56, 64	.50	6.00
2	64	56	.45	5.40
3	56	48	.40	4.80
4	48	32, 36, 40	.40	4.80
5	44	36, 40	.35	4.20
6	40	32, 36	.35	4.20
7	36	30, 32	.35	4.20
8	36	30, 32, 40	.35	4.20
9	32	24, 30	.35	4.20
10	30	24, 28, 32	.40	4.80
12	28	24, 32	.45	5.40
14	24	20	.45	5.40
16	22	20	.45	5.40
18	20	18	.50	6.00
20	20	16, 18	.50	6.00

TAPS

EFFECTIVE JULY 1, 1918

MACHINE SCREW TAP

Fig. 7558A

STOVE BOLT TAP

Fig. 7558B

MACHINE SCREW TAPS

These taps will be furnished whenever specified, but the adoption of the A. S. M. E. standard is strongly advocated.

When so ordered, the taps will be furnished in sets of taper, plug and bottoming, like hand taps.

Plug taps furnished unless otherwise specified.

Sizes, lengths and threads not listed are subject to special prices. Left-hand taps are special.

V THREADS

Screw Gauge No.	No. of Threads to Inch Std.	Also Furnished	Price Each	Price Per Dozen
1	72	56	.50	6.00
2	56	64	.45	5.40
3	48	56	.40	4.80
4	36	32, 40, 48	.40	4.80
5	36	40	.35	4.20
6	32	40	.35	4.20
7	32	..	.35	4.20
8	32	30, 40	.35	4.20
9	30	32	.35	4.20
10	24	28, 30, 32	.40	4.80
12	24	32	.45	5.40
14	20	24	.45	5.40
16	18	20	.45	5.40
18	18	20	.50	6.00
20	16	18	.50	6.00
..	..	..	...	....

A. S. M. E. STANDARD

Screw Gauge No.	No. of Threads to Inch Std.	Special	Price Each	Price Per Dozen
0	80	..	.50	6.00
1	72	64	.50	6.00
2	64	56	.45	5.40
3	56	48	.40	4.80
4	48	36, 40	.40	4.80
5	44	36, 40	.35	4.20
6	40	32, 36	.35	4.20
7	36	30, 32	.35	4.20
8	36	30, 32	.35	4.20
9	32	24, 30	.35	4.20
10	30	24, 32	.40	4.80
12	28	24	45	5.40
14	24	20	.45	5.40
16	22	20	.45	5.40
18	20	18	.50	6.00
20	20	18	.50	6.00

TWO AND THREE-FLUTE

For machine tapping only, in soft steel, aluminum, brass and other tough, stringy materials, 2 and 3-flute taps in machine screw sizes have been found more efficient than the regular taps.

These taps provide greater chip room with less liability of clogging and breakage.

Prices upon application.

STOVE BOLT TAPS

These taps correspond in size to American Screw Company's stove bolts.

Stove bolt taps are furnished in plug style only.

Sizes, lengths and threads not listed are subject to special prices.

Left hand taps are special.

Diam. of Tap Inches	No. of Threads to the Inch	Price Each	Price Per Doz.
3/16	24	.40	4.80
1/4	18	.45	5.40
5/16	18	.50	6.00
3/8	16	.55	6.60

TAPS AND COMBINED TAPS AND DRILLS

EFFECTIVE JULY 1, 1918

MACHINE OR NUT TAPS

Fig. 1051A

Diam. Inches	Total Length Inches	Number of Threads to Inch: U. S. Standard Threads	V Threads	S. A. E. Standard	Whitworth Standard Threads	Price Each
3/16	4½	24, 32	24	..	24	.60
¼	5	20	20	28	20	.60
5/16	5½	18	18	24	18	.70
⅜	6	16	16	24	16	.80
7/16	6½	14	14	20	14	.90
½	7	13	12	20	12	1.00
9/16	7½	12	12	18	12	1.15
⅝	8	11	11	18	11	1.35
11/16	8½	11	11	16	11	1.60
¾	9	10	10	16	10	1.85
13/16	9½	10	10	..	10	2.15
⅞	10	9	9	14, 18	9	2.45
15/16	10½	9	9	..	9	2.80
1	11	8	8	14	8	3.15
1⅛	11½	7	7	12	7	3.70
1¼	12	7	7	12	7	4.50
1⅜	12½	6	6	12	6	5.50
1½	13	6	6	12	6	6.75
1⅝	13½	5½	..	..	5	8.00
1¾	14	5	..	..	5	9.25
1⅞	14½	5	..	..	4½	10.75
2	15	4½	..	..	4½	12.25
2⅛	15½	4½	..	..	4½	14.00
2¼	16	4½	..	..	4	15.75
2⅜	16½	4	..	..	4	17.75
2½	17	4	..	..	4	20.00

All sizes, lengths and threads not listed will be considered special and subject to special prices. Left-hand taps are special.

COMBINED PIPE TAPS AND DRILLS

FOR TAPPING GAS AND WATER PIPES

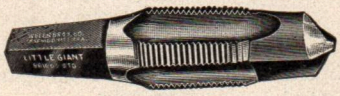


Fig. 1051B

Shanks for sizes ¼ to 1½-inch are ½x11/16 inch and 1¾ inches long.
Shanks for sizes 2 and 2½-inch are ¾x1 inch and 2 inches long.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
⅛	1.12	½	3.00	1¼	7.25
¼	2.25	¾	4.50	1½	8.50
⅜	2.50	1	6.00	2	10.75

TAPS

BIT BRACE

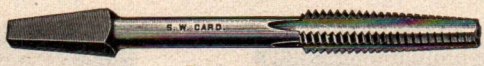


Fig. 9850A

Diameter Inches	Number of Threads to Inch		Price Each	Diameter Inches	Number of Threads to Inch		Price Each
	U.S. Stand.	V. Stand.			U.S. Stand.	V. Stand.	
$\frac{3}{16}$	24	24	....	$\frac{3}{8}$	16	16	....
$\frac{1}{4}$	20	20	....	$\frac{7}{16}$	14	14	....
$\frac{5}{16}$	18	18	....	$\frac{1}{2}$	13	12	....

Prices upon application.

All bit brace taps are furnished even size, U. S. Standard threads, unless otherwise ordered. Left hand taps are special. V threads furnished if so specified.

STAY BOLT

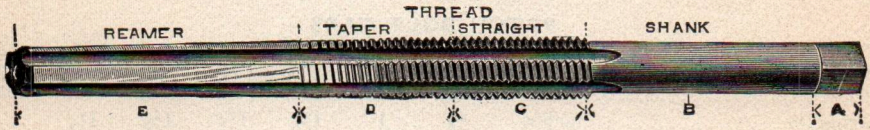


Fig. 9850B

Diameter, Inclusive, inches	$\frac{3}{4}$ to $\frac{7}{8}$	$\frac{15}{16}$ to 1	$1\frac{1}{16}$ to $1\frac{1}{8}$	$1\frac{3}{16}$ to $1\frac{1}{4}$	$1\frac{5}{16}$ to $1\frac{3}{8}$	$1\frac{7}{16}$ to $1\frac{1}{2}$
Price.....per inch	.40	.45	.50	.55	.60	.70

In ordering, state diameter and number of threads to the inch, also length and dimensions of parts as indicated in cut by letters A, B, C, D and E. These taps will be furnished regularly with 12 V threads to the inch and in either U. S. S. form or Whitworth Standard form of thread, 12 to the inch, at regular list and discount when so ordered. Diameter given is that of the thread at its straight part.

Prices are for each inch of length, 16 inches and upwards. Taps shorter than 16 inches will be charged as if 16 inches long.

Stay bolt taps 20 inches and 24 inches long, in sizes from $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$, and 1 inch diameter and having proportions shown in following table, are regularly made and carried in stock at factory.

Total Length Inches	Dimensions in Inches at				
	A	B	C	D	E
20	1	5	4	4	6
24	1	7	4	4	8

TAPS, REAMERS, ETC.

EFFECTIVE, JULY 1, 1918

BOILER TAP

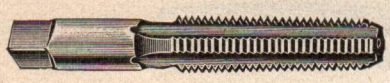


Fig. 7193A

PATCH BOLT TAP

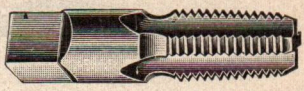


Fig. 7193B

BOILER TAPS, STRAIGHT OR TAPER

Diam. Inches	Length Over All Inches	Price Each	Diam. Inches	Length Over All Inches	Price Each
1/2	4 1/4	1.05	1 3/16	7	3.85
9/16	4 5/8	1.25	1 1/4	7 1/8	4.05
5/8	5	1.40	1 5/16	7 1/4	4.35
11/16	5 1/4	1.60	1 3/8	7 3/8	4.70
3/4	5 1/2	1.95	1 7/16	7 1/2	5.30
13/16	5 3/4	2.25	1 1/2	7 5/8	5.50
7/8	6	2.50	1 5/8	7 3/4	5.80
15/16	6 1/4	2.80	1 3/4	7 7/8	6.10
1	6 1/2	3.35	1 7/8	8	6.40
1 1/16	6 3/4	3.50	2	8	6.70
1 1/8	6 7/8	3.65	...	...	....

PATCH BOLT TAPS

Diameter ..... inches	1/2	9/16	5/8	11/16	3/4	13/16	7/8
Number V Threads to inch.....	12	12	12	12	12	12	12
Price ..... each	1.00	1.10	1.25	1.45	1.70	1.95	2.25
Diameter ..... inches	15/16	1	1 1/16	1 1/8	1 3/16	1 1/4	....
Number V Threads to inch.....	12	12	12	12	12	12	....
Price ..... each	2.40	2.80	2.90	3.00	3.15	3.35	....

All the above taps have 12 threads to the inch and can be furnished in either U. S. S. or V form of thread. U. S. S. form furnished unless otherwise ordered.

Taper boiler and patch bolt taps have a taper of 3/4 inch to the foot and the diameter is measured 1/2 inch from the large end of the thread. Sizes, lengths and threads not listed are subject to special prices. Left-hand taps are special.

PIPE TAPS AND REAMERS

PIPE TAP

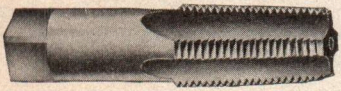


Fig. 7193C

PIPE REAMER

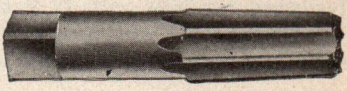


Fig. 7193D

Diameter ..... inches	1/8	1/4	3/8	1/2	3/4	7/8	1	1 1/4	1 1/2	1 3/4
Price, Taps or Reamers.. each	1.00	1.20	1.60	2.00	2.80	4.40	4.40	5.00	6.60	8.00
Diameter ..... inches	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	....
Price. Taps or Reamers.. each	10.00	12.00	12.00	18.00	22.50	25.50	30.00	36.00	45.00	....

CHASERS FOR SCREW

INSIDE

Fig. 7193E

OUTSIDE

Fig. 7193F

Cutting from 4 1/2, 5, 5 1/2, 6, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14 and 16 Threads to the Inch. . . ea. .40
" " 18, 19, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38 & 40 " " " " . . " .35

Furnished in V or U. S. S. threads. Specify when ordering. Threads not given in list are special.

PIPE END AND BURRING REAMERS

MUELLER PIPE END REAMERS

Patented

No. 1 PLAIN

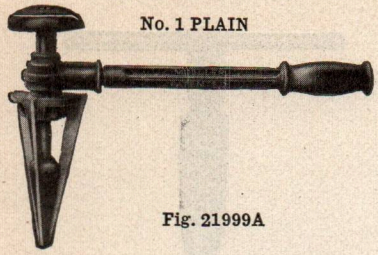


Fig. 21999A

No. 2, WITH RATCHET

Fig. 21999B

The ends must be reamed after cutting if the full carrying capacity is to be retained.

Pipe cutters leave a burr which is an obstruction to a free flow through the pipe, and reduces the pipe area as follows:

Size of Pipe Inches	Inside Diam. Inches	Diam. at Burr Inches	Per Cent Loss of Area if Not Reamed
1/4	23/64	1/4	59.4
3/8	1/2	3/8	43.8
1/2	5/8	33/64	31.2
3/4	53/64	45/64	28.0
1	1 3/64	59/64	22.5
1 1/4	1 3/8	1 9/32	13.2
1 1/2	1 39/64	1 31/64	15.0
2	2 1/16	1 61/64	7.01

The ratchet used with No. 2 is so constructed that the strain is divided into half a dozen bearings, greatly increasing the durability of the tool. Reams pipe from 3/8 to 3 inches, inclusive.

Price, No. 1, Plain.....each	5.40
" " 2, with Ratchet..... "	7.50
" Small Pattern, with Ratchet 3/8 to 1 1/4 Inches.....each	5.00

BURRING REAMERS

Nos. 241, 242, 242 1/2 AND 244

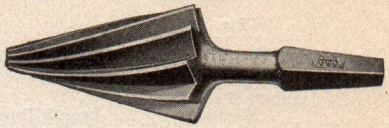


Fig. 21999C

These burring reamers are made of finest steel and designed especially for removing burrs from pipe, caused by cutting.

No.	Capacity Pipe Inches	Price Each
241	1/8 to 1/2	1.00
242	1/4 " 1	1.25
242 1/2	1/4 " 1 1/4	1.50
244	1/2 " 2	3.00

No. 243

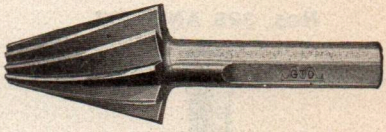


Fig. 21999D

243	1/4 to 1 1/4	1.50

No. 246

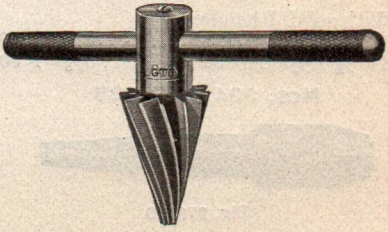


Fig. 21999E

246	1/2 to 2	4.00

G. T. D. TAP AND REAMER WRENCHES AND CHUCKS

Nos. 00 TO 8

Fig. 27879A

Made from drop forgings. Bodies have a neat mottled finish.

	Capacity Taps Inches				
No.	Hand	Machine Screw	Pipe	Length Inches	Price Each
00	1/16 to 3/16	0 to 13	.....	5	1.25
0	1/16 " 1/4	0 " 18	.....	7	1.50
4	1/16 " 3/8	0 " 24	1/8	9	1.75
5	3/16 " 1/2	10 " 30	1/8 to 1/4	11	2.00
6	1/4 " 3/4	14 " 30	1/8 " 3/8	15	2.50
7	3/8 " 1	15 " 30	1/8 " 3/4	19	3.50
7 1/2	3/8 " 1 1/4	22 " 30	1/4 " 3/4	31	6.50
8	3/4 " 1 1/2	.....	3/8 " 1/4	40	8.00

Nos. 22 AND 24

Fig. 27879B

Body parts malleable castings, handles of electrically welded steel tubing.

22	1 to 2 5/8	.....	1 to 2	55	15.00
24	1 3/4 " 4	.....	2 " 4	74	25.00

Nos. 329 AND 333

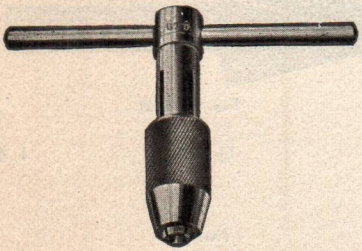


Fig. 27879C

With solid T-handles.

329	1/16 to 9/32	0 to 18	.....	2 1/2	.50
333	5/16 " 1/2	14 " 30	1/8	3 5/8	1.00

Nos. 334 AND 335

Fig. 27879D

For use in a bit brace.

334	1/16 to 9/32	0 to 18	.....	3 3/4	.50
335	5/16 " 1/2	14 " 30	1/8	4 7/8	1.00

Nos. 338 AND 339

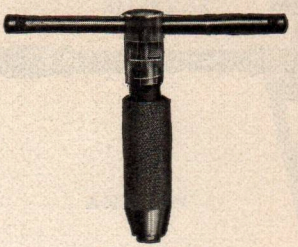


Fig. 27879E

Fitted with sliding T-handles and a right and left hand ratchet.

	Capacity Taps, Inches				
No.	Hand	Machine Screw	Pipe	Length Inches	Price Each
338	1/16 to 9/32	0 to 18	.....	4	1.00
339	1/4 " 1/2	14 " 30	1/8	4 5/8	2.00

Nos. 336 AND 337

Fig. 27879F

With long shank T-handles.

336	1/16 to 9/32	0 to 18	.....	8 3/4	.75
337	5/16 " 1/2	14 " 30	1/8	10 5/8	1.50

No. 340 TAP CHUCKS

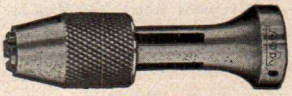


Fig. 27879G

Designed to fit No. 1851, 15/16-inch round die stock.

340	1/16 to 9/32	0 to 18	.....	2 5/8	.50

LITTLE GIANT SCREW PLATES

SINGLE STOCKED

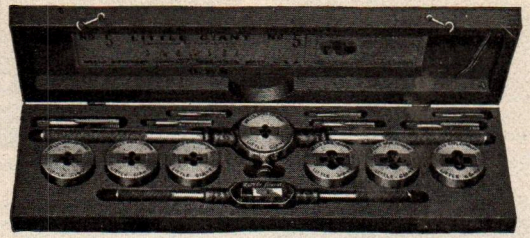


Fig. 5370A

No.	Length of Stock Inches	Diameter of Collet Inches	One (Taper) Tap and One Die for Each Size Indicated	Price per Set
1	14½	2	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$	18.50
2	23	2¾	$\frac{1}{4}^{20}$, $\frac{3}{8}^{16}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	22.75
3	26	2¾	$\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}	26.25
4	26	2¾	$\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}	29.25
5	23	2¾	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	27.50
5½	23	2¾	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	30.75
6	26	2¾	$\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}	35.00
7	26	2¾	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}	42.00
7½	26	2¾	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}	44.25
8	14½ and 26	2 and 2¾	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	30.00
9	14½ " 29	2 " 2¾	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}	43.50
20	40	4	$\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}, $1\frac{1}{8}^{7}$, $1\frac{1}{4}^{7}$	53.50
25	52	4½	$\frac{7}{8}^{9}$, 1^{8}, $1\frac{1}{8}^{7}$, $1\frac{1}{4}^{7}$, $1\frac{3}{8}^{6}$, $1\frac{1}{2}^{6}$	70.00
30	52	4½	$1\frac{1}{8}^{7}$, $1\frac{1}{4}^{7}$, $1\frac{3}{8}^{6}$, $1\frac{1}{2}^{6}$	59.00
40	23 and 40	2¾ and 4	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}, $1\frac{1}{8}^{7}$, $1\frac{1}{4}^{7}$.	68.50
50	26 " 52	2¾ " 4½	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}, $1\frac{1}{8}^{7}$, $1\frac{1}{4}^{7}$, $1\frac{3}{8}^{6}$, $1\frac{1}{2}^{6}$	92.00

Each assortment is put up in an oiled and varnished hardwood case and has a Little Giant Adjustable Tap Wrench, suitable for holding the range of tap sizes in the assortment. Nos. 7, 7½, 9, 40 and 50 have two tap wrenches.

U. S. S. threads furnished unless otherwise ordered. S. A. E. "V" form and Whitworth standard threads furnished, when specified, at regular prices.

LITTLE GIANT SCREW PLATES

SINGLE STOCKED

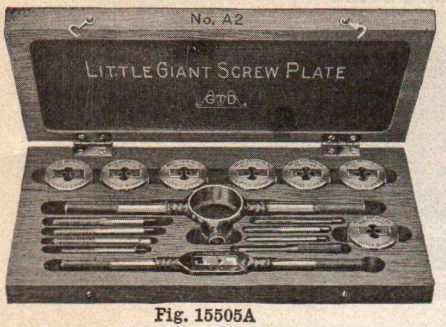


Fig. 15505A

Each of assortments listed below contains Little Giant dies, and plug taps in addition to collets, stocks and tap wrenches.

No. A1

Length stock, in., 7½; diam. of collet, in., 1¼. Sizes, $\frac{1}{8}^{40}$, $\frac{5}{32}^{36}$, $\frac{3}{16}^{24}$, $\frac{7}{32}^{24}$, $\frac{1}{4}^{20}$.
Price .....per set **11.50**

No. A1½

Length stock, in., 7½; diam. of collet, in., 1¼. Sizes, $\frac{1}{16}^{64}$, $\frac{3}{32}^{50}$, $\frac{1}{8}^{40}$, $\frac{5}{32}^{36}$, $\frac{3}{16}^{24}$, $\frac{7}{32}^{24}$, $\frac{1}{4}^{20}$.
Price.....per set **14.50**

No. A2

Length stock, in., 7½; diam. of collet, in., 1¼. Sizes, $\frac{7}{64}^{48}$, $\frac{1}{8}^{40}$, $\frac{9}{64}^{40}$, $\frac{5}{32}^{36}$, $\frac{3}{16}^{24}$, $\frac{7}{32}^{24}$, $\frac{1}{4}^{20}$.
Price .....per set **14.50**

No. A2½

Length stock, in., 7½; diam. of collet, in., 1¼. Sizes, $\frac{1}{16}^{64}$, $\frac{5}{64}^{64}$, $\frac{3}{32}^{50}$, $\frac{7}{64}^{60}$, $\frac{1}{8}^{40}$, $\frac{9}{64}^{40}$, $\frac{5}{32}^{36}$, $\frac{3}{16}^{30}$, $\frac{7}{32}^{28}$, $\frac{1}{4}^{20}$.
Price.....per set **19.50**

No. A3

Length stock, in., 7½; diam. of collet, in., 1¼. Sizes, $\frac{7}{64}^{48}$, $\frac{1}{8}^{40}$, $\frac{9}{64}^{40}$, $\frac{5}{32}^{36}$, $\frac{11}{64}^{32}$, $\frac{3}{16}^{24}$, $\frac{13}{64}^{24}$, $\frac{7}{32}^{24}$, $\frac{15}{64}^{24}$, $\frac{1}{4}^{20}$.
Price .....per set **19.50**

No. AA2

Length stock, in., 7½; diam. of collet, in., 1¼. Sizes, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24}.
Price.....per set **11.50**

No. AA4

Length stock, in., 7½; diam. of collet, in., 1¼. Sizes, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24}, 14^{20}, 16^{18}.
Price.....per set **14.50**

No. A10

Length stock, in., 7½ and 13½; diam. of collet, in., 1¼ and 1⅝. Sizes, $\frac{1}{8}^{40}$, $\frac{5}{32}^{36}$, $\frac{3}{16}^{24}$, $\frac{7}{32}^{24}$, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$.
Price.....per set **18.25**

COMBINATION

Fig. 15505B

Each assortment contains the following; U. S. S. taper taps, S. A. E. plug taps, and Little Giant dies for each thread standard size, collets, bit-brace shank in addition to stocks and tap wrenches.

No. 310

Length stock, in., 14½; diam. of collet, in., 2. Sizes, U. S. Std. $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$. Sizes, S. A. E. Std. $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{30}$, $\frac{1}{2}^{20}$.
Price .....per set **28.25**

No. 311

Length stock, in., 14½ and 23; diam. of collet, in., 2 and 2¾. Sizes, U. S. Std., $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$. Sizes, S. A. E. Std., $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$.
Price.....per set **56.00**

No. 312

Length stock, in., 14½ and 29; diam. of collet, in., 2 and 2¾. Sizes, U. S. Std. $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}. Sizes, S. A. E. Std., $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, 1^{14}.
Price.....per set **79.00**

SCREW PLATES FOR AUTOMOBILES

WITH S. A. E. (FORMERLY A. L. A. M.) STD. THREADS

No. 305

Length stock, in., 14½; diam. of collet in., 2. Sizes, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$.
Price.....per set **18.50**

No. 306

Length stock, in., 26; diam. of collet, in., 2¾. Sizes, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$ and 1^{14}.
Price.....per set **32.75**

No. 307

Length stock, in., 23; diam. of collet, in., 2¾. Sizes, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$ and 1^{14}.
Price.....per set **48.25**

O. K. SCREW PLATES

O. K. 1 ASSORTMENTS

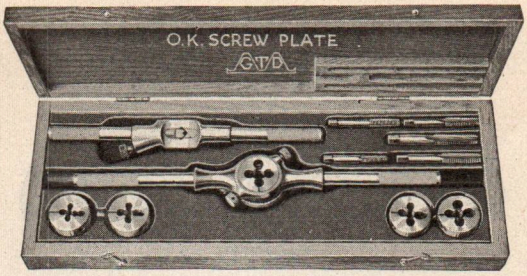


Fig. 22112A

These new O. K. Screw Plates include an O. K. Adjustable Guide Stock with device for locking the jaws; O. K. Patent Adjustable Dies; G. T. D. Adjustable Tap Wrench and G. T. D. Taper Taps of high quality. Each set is put up in a handsomely finished and polished wood case.

SET No. 1

Five sizes, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$. Taper Taps; O. K. Dies 1½ outside diameter; Adjustable Guide, Stock No. O. K. 1, 14 inches long; adjustable tap wrench, No. O. K. 4, 10½ inches long.

Price.....per set **13.50**

SET No. 4

Five sizes, $\frac{1}{4}^{20}$, $\frac{3}{8}^{16}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$. Taper Taps; O. K. Dies; 2 inches outside diameter; adjustable guide stock, No. O. K. 5, 23 inches long; adjustable tap wrench, No. O. K. 5, 15 inches long.

Price.....per set **17.75**

ASSORTMENT O. K. 5-T

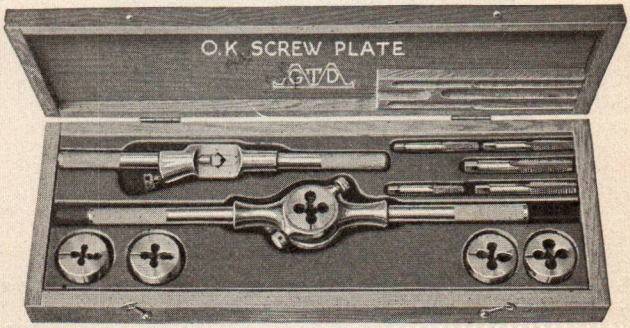


Fig. 22112B

SET No. 5

Five sizes, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$. Taper taps; O. K. dies 2 inches outside diameter; adjustable guide stock, No. O. K. 5, 23 inches long; adjustable tap wrench, No. O. K. 5, 15 inches long.

Price.....per set **21.00**

SET No. 5½

Eight sizes, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$. Taper taps; O. K. dies 2 inches outside diameter; adjustable guide stock, No. O. K. 5, 23 inches long; adjustable tap wrench, No. O. K. 5, 15 inches long.

Price.....per set **23.00**

O. K. SCREW PLATES

ASSORTMENTS WITH U. S. STANDARD THREADS

Fig. 26593A

SET No. 10

Nine sizes, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}. Taper taps; O. K. dies 2 inches outside diameter; adjustable guide stock, No. O. K. 10, 26 inches long; 2 adjustable tap wrenches, No. O. K. 3, eight inches long. No. O. K. 6, 20 inches long.
Price.....per set **31.00**

SET No. 10½

Ten sizes, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}. Taper taps, O. K. dies, 2 inches outside diameter; adjustable guide stock, No. O. K. 10, 26 inches long; 2 adjustable tap wrenches, No. O. K. 3, 8 inches long. No. O. K. 6, 20 inches long.
Price.....per set **33.00**

ASSORTMENT FULL MOUNTED SCREW PLATES

Fig. 26593B

SET No. 71

Five sizes, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$. Taper taps; O. K. dies; separate stock for each die; adjustable tap wrench No. O. K. 4, 10½ inches long.
Price.....per set **16.50**

SET No. 75

Seven sizes, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$. Taper taps; O. K. dies; separate stock for each die; adjustable tap wrench No. O. K. 5, 15 inches long.
Price.....per set **28.00**

SET No. 77

Nine sizes, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}. Taper taps; O. K. dies; separate stock for each die; 2 adjustable tap wrenches No. O. K. 2, 8 inches long. No. O. K. 6, 20 inches long.
Price.....per set **43.50**

O. K. SCREW PLATES

WITH S. A. E. STANDARD THREADS

SET No. 20

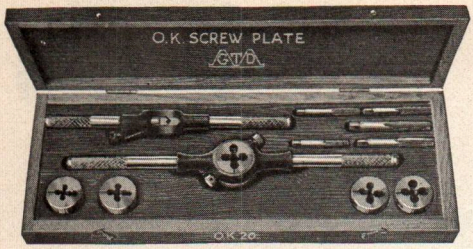


Fig. 22476A

SET No. 32

Nine sizes, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, 1^{14}, with plug taps; O. K. dies, 2-inches outside diameter; adjustable guide stock No. O. K. 10, 26 inches long; 2 adjustable tap wrenches No. O. K. 3-8 inches long. No. O. K. 6, 20-inches long. Weight O. K. 31, 12 pounds. Weight O. K. 32, 22 pounds.

Price.....per set **31.00**

SINGLE STOCK SCREW PLATES

SET No. 20

Five sizes, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, with plug taps; O. K. dies, $1\frac{1}{2}$-inches outside diameter; adjustable guide stock No. O. K. 1, 14-inches long; adjustable tap wrench No. O. K. 4, $10\frac{1}{2}$ inches long; Weight $6\frac{1}{2}$ pounds.

Price.....per set **13.50**

SET No. 31

Seven sizes, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$.

Price.....per set **21.00**

SET No. 31

Fig. 22476B

FULL MOUNTED SCREW PLATES

FOR AUTOMOBILES

SET No. 76

Fig. 22476C

SET No. 73

Five sizes, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, with plug taps; O. K. dies, separate stock for each die; adjustable tap wrench No. O. K. 4, $10\frac{1}{2}$ inches long. Weight 9 pounds.

Price.....per set **16.50**

SET No. 76

Seven sizes, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $1\frac{3}{4}^{16}$, with plug taps; O. K. dies, separate stock for each die; adjustable tap wrench No. O. K. 5, 16 inches long. Weight 16 pounds.

Price.....per set **28.00**

SET No. 79

Nine sizes, $\frac{1}{2}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, 1^{14}, with plug taps; O. K. dies separate stock for each die; adjustable tap wrenches No. O. K. 3, 8 inches long. No. O. K. 6, 20 inches long. Weight 33 pounds.

Price..... per set **43.50**

SOLID HEXAGON AND SQUARE BOLT DIES

HEXAGON

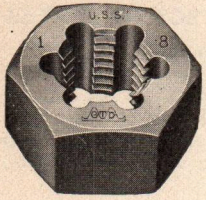


Fig. 26289A

SQUARE

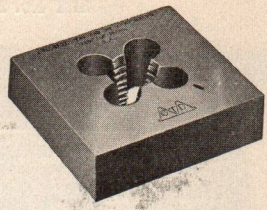


Fig. 26289B

SOLID HEXAGON BOLT DIES

These dies are used only for repair work, for dressing over bruised or rusty threads, and will go into any space that hexagon nuts will go.

They can be used in bit-brace sockets, ratchet or monkey-wrenches, and will be found convenient in many ways. They are accurate, durable and will give satisfactory service.

U. S. Std. threads furnished unless otherwise ordered.

Size Inches	Threads per Inch: U. S. Std.	S. A. E. Std.	Whit. Std.	Size of Die: Across Flats	Thickness	Price Each
1/4	20	28	20	19/32	1/4	.60
5/16	18	24	18	11/16	5/16	.65
3/8	16	24	16	25/32	3/8	.70
7/16	14	20	14	7/8	7/16	.75
1/2	13	20	12	1 1/16	1/2	.80
9/16	12	18	12	1 1/16	1/2	.85
5/8	11	18	11	1 1/4	5/8	.90
11/16	11	16	11	1 7/16	3/4	.95
3/4	10	16	10	1 7/16	3/4	1.00
7/8	9	14	9	1 5/8	7/8	1.10
1	8	14	8	1 13/16	1	1.20
1 1/8	7	12	7	2	1	1.40
1 1/4	7	12	7	2 3/16	1	1.60
1 3/8	6	12	6	2 3/8	1	1.80
1 1/2	6	12	6	2 9/16	1	2.00

SOLID SQUARE BOLT DIES

U. S. S. threads furnished unless otherwise ordered.

Sizes, dimensions and threads not listed, are subject to special prices.

Left-hand dies are special.

Cutting Sizes Inches	No. of Threads to the Inch	Size of Square Inches	Thickness Inches	Price Each	Cutting Sizes Inches	No. of Threads to the Inch	Size of Square Inches	Thickness Inches	Price Each
1/4	20	2 1/2	1/2	1.80	15/16	9	2 1/2	3/4	2.55
5/16	18	2 1/2	1/2	1.80	1	8	2 1/2	1	2.70
3/8	16	2 1/2	1/2	1.80	1 1/8	7	2 1/2	1	3.00
7/16	14	2 1/2	1/2	1.80	1 1/4	7	2 1/2	1	3.30
1/2	13	2 1/2	3/4	1.80	1 3/8	6	2 1/2	1	3.60
9/16	12	2 1/2	3/4	1.90	1 1/2	6	3	1	3.90
5/8	11	2 1/2	3/4	2.00	1 5/8	5 1/2	3	1	4.20
11/16	11	2 1/2	3/4	2.10	1 3/4	5	3	1 1/4	5.40
3/4	10	2 1/2	3/4	2.20	1 7/8	5	3 1/2	1 1/2	6.50
13/16	10	2 1/2	3/4	2.30	2	4 1/2	3 3/4	2	7.50
7/8	9	2 1/2	3/4	2.40	...	...	...	...	....

STAR CHUCKS

No. 4

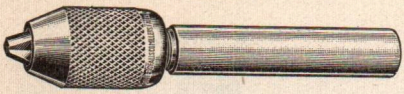


Fig. 24952A

No. 5

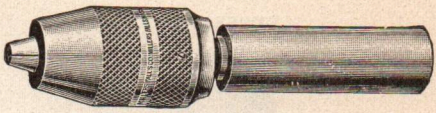


Fig. 24952B

These chucks are substantially made and give excellent service. They are meant to hold round shanks which they grip accurately and tightly.

The jaws are carefully adjusted into the socket and close by pressure of the spindle. Springs controlling the jaws are situated down in the base where they cannot be reached by the shank of a bit and jammed or knocked out.

Polished and with machinist's finish.

Number		4	5
Capacity	inches	0–3/16	0–1/4
Outside Diameter of Chuck	"	13/16	1
Dimensions of Shank	"	2½x½	2½x½
Price	each	**1.30**	**1.75**

No. 6

Fig. 24952C

No. 7

Fig. 24952D

Number		6	7
Capacity	inches	0–3/8	0–½
Outside Diameter of Chuck	"	1¼	1½
Dimensions of Shank	"	2½x½	2½x½
Price	each	**2.65**	**3.50**

CHUCKS FURNISHED TO ORDER WITH SHANKS AS FOLLOWS WITHOUT EXTRA CHARGE

Number		5	6	7
Diameter of Shank	inches	41/64	41/64	41/64 or 7/8

Special shanks, straight or taper, at additional charge of 50 cents each.

When ordering taper shanks, state exact taper wanted.

SKINNER DRILL CHUCKS

1918 REVISION

NEW MODEL DRILL CHUCKS

EXTERIOR

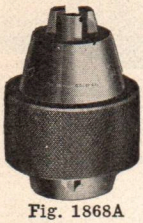


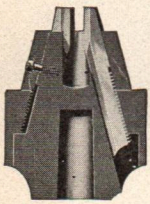
Fig. 1868A

The Skinner New Model Drill Chuck is especially adapted for all light and rapid drilling, such as is done on sensitive drills and hand lathes, where accuracy is required. The chuck is operated by hand, and is tightened by means of a spanner wrench.

It may be taken apart readily for cleaning and oiling, by removing the 3 screws in the cap, taking that off and revolving the nut enough to disengage the jaws.

In putting the chuck together it is necessary to notice that the number of

SECTIONAL



the jaw corresponds with number of slot in chuck 130D-1. A hole, the full capacity, may be drilled through the center without injury to the chuck, making it most convenient for holding rods, etc. The jaws are ground true in the chuck after the jaws are hardened. Every chuck is guaranteed to be accurate within .002 inch.

No.	Holds Drills Inches	Outside Diam. Inches	Length of Body Inches	Price Each
11	0 to $\frac{7}{32}$	$1\frac{3}{8}$	$1\frac{9}{16}$	**5.50**
12	0 " $\frac{3}{8}$	$1\frac{15}{16}$	$2\frac{1}{8}$	**5.50**
13	0 " $\frac{17}{32}$	$2\frac{11}{16}$	$3\frac{1}{16}$	**9.00**

GEARED PATTERN DRILL CHUCKS

EXTERIOR

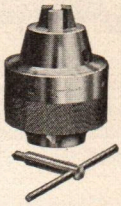


Fig. 1868B

The Skinner Geared Pattern Drill Chuck is recommended for use on drills and lathes because of its accuracy and convenience. The gears are all enclosed beneath the surface (patented) of the chuck away from chips and dirt.

The chuck is hand operated, save for the final grip on the drill, by means of a common wrench, which has no tendency to revolve the spindle of the lightest machine. It is made entirely of steel and of such grades as are best adapted to the different parts.

SECTIONAL

The chuck may be taken apart readily for cleaning and oiling, by removing the 3 screws in the cap, taking that off, and revolving the nut enough to disengage the jaws. To get at gearing, take out the 2 small screws on opposite sides of the nut, remove the sleeve, and pinion gears can be removed.

No.	Holds Drills Inches	Outside Diam. Inches	Length of Body Inches	Price Each
21	0 to $\frac{1}{4}$	$1\frac{5}{8}$	$1\frac{19}{32}$	**7.00**
22	0 " $\frac{3}{8}$	$2\frac{5}{32}$	$2\frac{1}{8}$	**8.00**
23	0 " $\frac{17}{32}$	$2\frac{3}{4}$	$3\frac{1}{16}$	**11.00**
24	$\frac{1}{16}$ " $\frac{3}{4}$	$3\frac{1}{2}$	$3\frac{7}{8}$	**20.00**

JACOBS IMPROVED DRILL CHUCKS

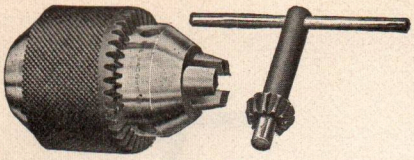


Fig. 2748A

The Jacobs Improved Drill Chuck is similar to the old, well-known spanner sleeve chuck in general form and structure. It is made with a patented device (the toothed sleeve and key), this device distinguishing it from others as, by the action of the key, the initial or final adjustment may be easily and effectively performed with only one hand, leaving the other hand free to adjust or remove the drill.

The No. 2 chuck is especially adapted to sensitive and high speed drill presses, lathe, tapping machines and for many other purposes.

The No. 5 chuck is not only especially adapted for use as a drill chuck, but is a most convenient tool to use in connection with an engine lathe, as a hole may be bored through the chuck and shank the size of its full capacity.

SECTIONAL REGULAR

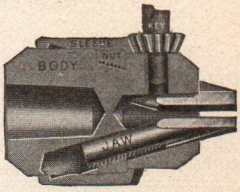


Fig. 2748B

SECTIONAL FLAT BACK

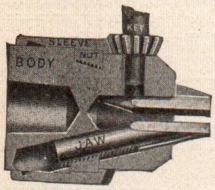


Fig. 2748C

The Nos. 1A, 2A, 3A, and 6A are made without the chamfered portion at the back end of the body, making them shorter than the regular chuck and giving them the name of "flat back." The back end of the body of these chucks is sometimes used as a thrust bearing. These chucks are used on many of the best known electric, pneumatic and flexible shaft drills and give excellent satisfaction.

Number	1	1A	2	2A	3
For Drills.....inches	0 to $\frac{13}{64}$	0 to $\frac{1}{4}$	0 to $\frac{21}{64}$	0 to $\frac{3}{8}$	0 to $\frac{17}{32}$
Price .....each	**5.50**	**5.50**	**5.50**	**5.50**	**9.00**
Number	3A	4	5	6	6A
For Drills.....inches	0 to $\frac{17}{32}$	$\frac{1}{16}$ to $\frac{3}{4}$	$\frac{3}{8}$ to 1	0 to $\frac{1}{2}$	0 to $\frac{1}{2}$
Price .....each	**9.00**	**18.00**	**25.00**	**9.00**	**9.00**

REPAIRS

KEY

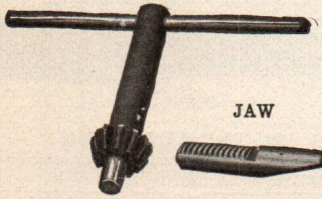


Fig. 2748D

JAW

Fig. 2748E

BODY

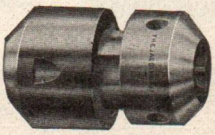


Fig. 2748F

NUT

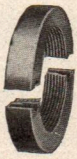


Fig. 2748G

SLEEVE

Fig. 2748H

Number	1	1A	2	2A	3	3A	4	5	6	6A
Price, Keys.....each	.30	.30	.30	.30	.45	.45	.75	1.25	.45	.45
" Jaws.....per set	1.65	1.65	1.65	1.65	2.70	2.70	4.50	6.75	2.70	2.70
" Nuts .....each	.55	.55	.55	.55	.90	.90	1.50	2.25	.90	.90
" Sleeves .... "	.55	.55	.55	.55	.90	.90	1.50	2.25	.90	.90

STANDARD IMPROVED DRILL CHUCKS AND ARBORS

IMPROVED DRILL CHUCK
No. 137

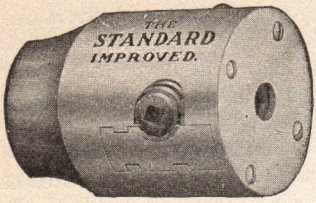


Fig. 4043A

KEY
No. 137A

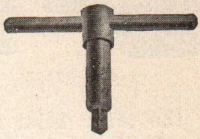


Fig. 4043B

IMPROVED DRILL CHUCKS

This chuck has no projecting jaws, and the plate prevents the use of larger tools than the chuck is designed for. It is very substantial, guaranteed to hold true and not injure the shank of the drill. It holds round or square work. The jaws are guided by three strong gibs, and the screws are larger than in any chuck of similar size and type. The jaws and screws are of tool steel, carefully tempered. The hole in the hub is made to fit a taper arbor, but can be bored out and threaded to a special template at small cost.

Number	Diameter Inches	Length Over All Inches	Capacity Inches	Size of Tapered Hole in Hub	Price Each
00	1 3/8	2 3/32	0 to 1/4	.533x.587x 7/8 in. Deep	6.00
0	1 11/16	2 15/32	0 " 3/8	.533x.596x1 " "	6.50
1	2 3/16	2 13/16	0 " 1/2	.533x.596x1 " "	7.00
2	2 7/8	3 3/8	0 " 3/4	.750x 810x1 1/8 " "	8.00
3	3 7/16	4 1/4	0 " 1	.876x.967x1 11/16 " "	10.00

KEYS, JAWS AND SCREWS

Number of Chuck	00	0	1	2	3
Price, No. 137A, Keys ..... each	.50	.50	.60	.75	1.00
" " 137B, Jaws ..... "	1.75	2.00	2.25	2.50	2.75
" " 137C, Screws ..... "	1.00	1.00	1.00	1.10	1.25

ARBORS, No. 137D

For Standard Improved Drill Chuck

WITH SHANK ½ OR 11/64-INCH DIAMETER 2½ INCHES LONG

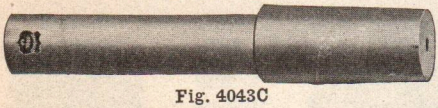


Fig. 4043C

WITH STANDARD TAPER SHANK

Fig. 4043D

WITH ½ OR 11/64-INCH DIAMETER SHANKS, 2½ INCHES LONG

Fitted to Chuck Number	00, 0 and 1	2	3
Price ..... each	.50	.75	1.00

WITH STANDARD TAPER SHANKS

These can be fitted to any size of chuck.

Standard Taper Shank Number	1	2	3	4
Price ..... each	1.00	1.00	1.25	1.50

CUSHMAN INDEPENDENT CHUCKS

FOUR-JAWED

IRON AND STEEL BODY

FRONT VIEW

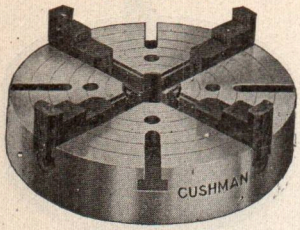
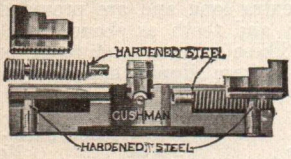


Fig. 3655A

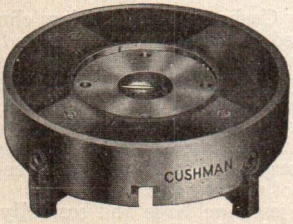
This chuck is known as the heavy pattern and is the type most used for heavy work. The body is made heavy and strong and of improved design. The 8-inch size and under have solid faces. The 9 and 10-inch have openings only in the face.

SECTIONAL



The 12 to 16-inch have T slots only in face, and 18 to 36-inch have T slots and openings. Bolts for attaching to plate and a powerful steel wrench for operating the jaws are furnished with each chuck.

REAR VIEW



The jaws are made from open hearth steel and they are carefully fitted to the body and casehardened. They are made in one piece and can be quickly and easily reversed by running them out of the body and turning them end for end.

IRON BODY CHUCKS

Size Inches	*Diam. of Hole Inches	**Diam. Recess Inches	Price Each
4½	1	4⅛	**20.00**
6	1 9/16	5⅝	**22.00**
8	1¾	4¾	**26.00**
9	1¾	4¾	**28.00**
10	2	5⅝	**30.00**
12	2¾	6 11/16	**35.00**
14	3	6 11/16	**40.00**
15	3	7 13/16	**43.00**
16	3	7 13/16	**46.00**
18	4	9½	**54.00**
20	4	9½	**62.00**
22	5	11	**70.00**
24	5	11	**80.00**
26	5	12	**93.00**
28	5	13	**110.00**
30	5	15	**130.00**
32	5	15	**155.00**
34	6	17¾	**180.00**
36	6	17¾	**210.00**

*Through center.
**For flange.

STEEL BODY CHUCKS

These chucks are designed for use where the service requires unusual holding power. The general dimensions are about the same as the iron body, and they all have the hardened steel thrust bearings for the screws.

Size Inches	Price Each	Size Inches	Price Each
8	**42.00**	20	**100.00**
10	**50.00**	22	**114.00**
12	**58.00**	24	**130.00**
14	**67.00**	26	**150.00**
16	**76.00**	28	**175.00**
18	**87.00**	30	**200.00**

The capacity of these chucks is as great as any chuck made of this type, and they will hold pieces from 1 to 4 inches larger than their rated diameter; but when a chuck jaw is extended to hold larger than the diameter of chuck body, many of the jaw teeth have then become disengaged with the screw threads, and the wider the chuck is opened the fewer jaw teeth and screw threads are left to withstand all the strain from holding the extra large work. The safe capacity of this type of chuck is but little beyond its nominal size.

CUSHMAN CHUCKS

UNIVERSAL GEARED SCROLL CHUCKS

No. 34

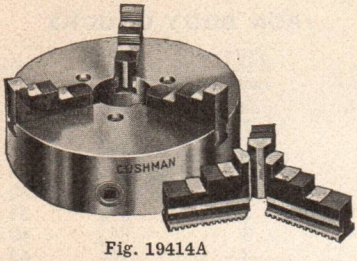


Fig. 19414A

Two sets of jaws are furnished with this chuck — one set of No. 1 Style and one set of No. 2 Style. They can be changed very easily and quickly.

Having both sets, the chuck is adapted for any kind of work and more of this style is sold than any other.

Size Inches	Price Each	Size Inches	Price Each
...	.....	9	38.00
3	20.00	10½	44.00
4	22.00	12	52.00
5	24.00	15	70.00
6	28.00	18	92.00
7½	32.00	21	120.00

No. 44

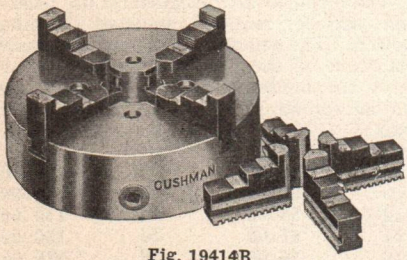


Fig. 19414B

Two sets of jaws are furnished with this chuck — one set of the No. 1 Style and one set of the No. 2 Style. The jaws can be changed very easily and quickly. Having both sets, chuck is adapted for any kind of work.

Two pinion gears are usually put in 4-jaw chucks, but some sizes may have three or more.

3	22.00	10½	49.00
4	24.00	12	58.00
5	27.00	15	76.00
6	31.00	18	102.00
7½	36.00	21	135.00
9	42.00	....	.....

No. 81

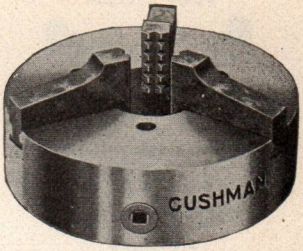


Fig. 19414C

Special chucks for screw machines, cutting-off machines, and all kinds of bar work.

These chucks are practically the same as the regular line of universal geared scroll chucks, except that the jaws are made extra long and are provided with grooves and teeth as shown in illustration. These grooves and teeth prevent the stock from slipping either way.

Size Inches	Price, Each No. 81 3-jaw	Price, Each No. 82 4-jaw
7½	27.00	30.00
9	33.00	36.00
10½	38.00	42.00
12	45.00	50.00
15	60.00	65.00
18	80.00	87.00
21	105.00	115.00

This Cushman line of 2-jaw chucks is designed for work where 3-jaw and 4-jaw chucks are impracticable. Their strength is very great compared with their size, and they are designed for manufacturing purposes and for hard service generally.

The bodies are heavy and strong, and have large jaw bearings to stand the severe strain of sliding jaws.

The jaws are large and carefully fitted and hardened. The screws are of large diameter with strong square threads.

The slip jaw chucks are specially adapted for brass work and for holding soft metal pieces and pieces of special shape. The slips or faces are usually used soft.

DROP-FORGED STEEL LATHE DOGS

BENT TAIL SQUARE HEAD SCREW

Fig. 7629A

STRAIGHT TAIL HEADLESS SCREW

Fig. 7629B

HEAVY DUTY STRAIGHT TAIL DOUBLE SCREW

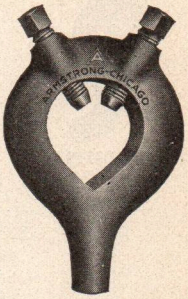


Fig. 7629C

SINGLE SCREW LATHE DOGS

BENT TAIL			STRAIGHT TAIL				Price, Each			
Number Sq. Hd. Screw	Number Headless Screw	Weight Each Pounds	Number Sq. Hd. Screw	Number Headless Screw	Weight Each Pounds	Capacity In.	Wrench for Headless Screw	Extra Screws Square Head	Extra Screws Headless	*Complete
1	1-H	1/4	21	21-H	1/4	3/8	.06	.10	.10	.50
2	2-H	3/8	22	22-H	1/4	1/2	.07	.11	.12	.55
3	3-H	1/2	23	23-H	1/2	3/4	.08	.12	.15	.60
4	4-H	3/4	24	24-H	3/4	1	.09	.14	.18	.70
5	5-H	1 1/2	25	25-H	1 1/4	1 1/4	.10	.15	.21	.85
6	6-H	2	26	26-H	2	1 1/2	.12	.19	.25	1.00
7	7-H	2 3/4	27	27-H	2 1/2	1 3/4	.13	.22	.30	1.20
8	8-H	3 1/2	28	28-H	3 1/4	2	.15	.26	.36	1.40
9	9-H	5 1/4	29	29-H	4 3/4	2 1/2	.19	.33	.43	1.80
10	10-H	6 3/4	30	30-H	6 3/4	3	.24	.36	.43	2.30
11	11-H	9	31	31-H	8	3 1/2	.30	.50	.58	3.00
12	12-H	12	32	32-H	11	4	.37	.55	.58	4.50
13	13-H	18	33	33-H	17	5	.45	.75	.75	8.00
14	14-H	24	34	34-H	22	6	.55	.80	.75	12.00

HEAVY DUTY LATHE DOGS—STRAIGHT TAIL, DOUBLE SCREW

Number Sq. Hd. Screws	Number Headless Screws	Capacity Inches	Weight Each Pounds	Wrench for Headless Screws	Extra Screws Sq. Hd.	Extra Screws Headless	*Complete
128	128-H	2	5	.15	.26	.36	2.75
129	129-H	2 1/2	6 3/4	.19	.33	.43	3.50
130	130-H	3	8 3/4	.24	.36	.43	4.50
131	131-H	3 1/2	12 1/2	.30	.50	.58	6.00
132	132-H	4	15	.37	.55	.58	8.00
133	133-H	5	21	.45	.75	.75	12.00
134	134-H	6	29	.55	.80	.75	17.00
135	135-H	7	37	.65	1.15	.90	23.00
136	136-H	8	50	.75	1.30	.90	28.00

*Prices do not include wrench. When ordering dogs with headless screws, specify whether wrenches are wanted or not and, if wanted, how many. When not otherwise specified, one wrench for each size dog ordered will be shipped and charged for. Dogs with square head screws will be shipped when not otherwise specified.

LATHE DOGS AND CLAMPS

HEAVY LATHE DOG

Fig. 23112A

LIGHT LATHE DOG

Fig. 23112B

LATHE DOG WRENCH

Fig. 23112C

HEAVY LATHE DOGS

No.	Size Inches	Price Each	No.	Size Inches	Price Each	No.	Size Inches	Price Each
1	3/8	.40	8	1 1/4	.80	15	3	1.60
2	1/2	.50	9	1 3/8	.95	16	3 1/2	1.80
3	5/8	.60	10	1 1/2	.95	17	4	2.10
4	3/4	.60	11	1 3/4	1.10	18	4 1/2	2.75
5	7/8	.70	12	2	1.20	19	5	3.25
6	1	.70	13	2 1/4	1.35	..	...	....
7	1 1/8	.80	14	2 1/2	1.45	..	...	....

LIGHT LATHE DOGS

1	3/8	.35	5	1 1/4	.75	9	2 1/2	1.40
2	1/2	.35	6	1 1/2	.85	10	3	1.50
3	3/4	.50	7	1 3/4	1.00	11	3 1/2	1.70
4	1	.60	8	2	1.10	12	4	1.90

LATHE DOG WRENCHES

Price.....each **.75**

CARRIAGE CLAMP

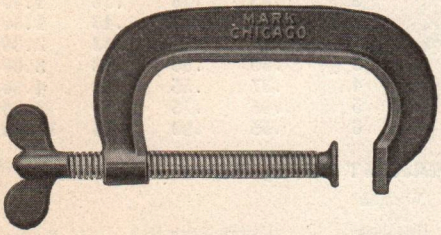


Fig. 23112D

MACHINIST'S CLAMP

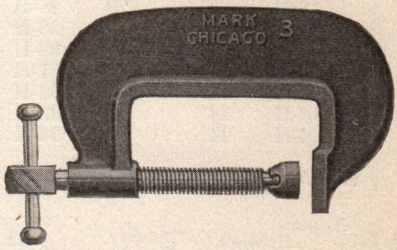


Fig. 23112E

CARRIAGE CLAMPS

Opens.....inches	2 1/2	3	4	5	6
Price.....per dozen	**3.00**	**3.50**	**4.50**	**5.50**	**7.00**
Opens.....inches	7	8	10	12	....
Price.....per dozen	**8.50**	**11.00**	**15.00**	**17.00**	....

MACHINISTS' CLAMPS

Number.....	1	2	3	4
Opening to.....inches	2	3	4	5
Price.....each	**1.75**	**2.00**	**2.25**	**2.50**
Number.....	5	6	7	8
Opening to.....inches	6	8	10	12
Price.....each	**2.75**	**3.25**	**3.75**	**4.25**

DROP-FORGED LATHE DOGS AND CLAMPS

CLAMP LATHE DOG

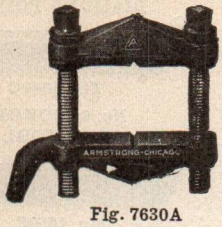


Fig. 7630A

MACHINISTS' CLAMP

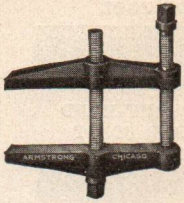


Fig. 7630B

DROP-FORGED CLAMP LATHE DOGS

Number	11	12	13	14
Capacity between Screws ... inches	1¾	2¼	2¾	3½
Weight ... pounds	⅝	1	1¾	2¾
Price ... each	1.50	2.00	2.50	3.50
" Extra Screws ... "	.10	.15	.20	.30

DROP-FORGED MACHINISTS' CLAMPS

Number	1	2	3	4
Capacity, Opens to ... inches	1¼	2¼	3¼	4¼
Weight ... pounds	¾	1	1¾	2¾
Price ... each	1.50	2.00	2.50	3.00
" Extra Screws ... "	.10	.12	.15	.20

C CLAMPS

HEAVY DESIGN

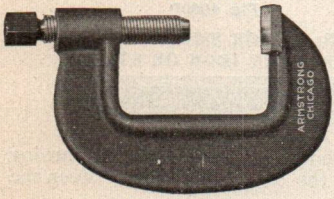


Fig. 7630C

LIGHT DESIGN

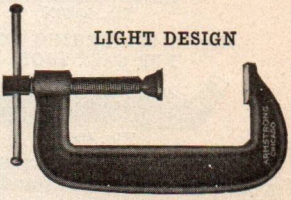


Fig. 7630D

HEAVY DESIGN
WITH LONG HUB AND EXTRA LARGE SCREW

Number	9	10	11	12	13	14	15	16	18	20	22
Capacity ... inches	¾	1¼	1¾	2¼	3¼	4½	5½	6½	8½	10½	12½
*Depth ... "	¾	1⅛	1½	1⅞	2¼	2¾	3¼	3½	3¾	3⅞	4
Size of Screw ... "	⅜	7/16	9/16	11/16	13/16	15/16	1	1⅛	1¼	1¼	1¼
Weight ... pounds	½	¾	1¾	3½	6	10	13½	18½	25	30	32
Price, Complete ... each	.50	.75	1.25	1.75	2.50	3.25	4.00	5.00	7.00	9.50	12.50
" Extra Screws, Alloy Steel. "	.10	.12	.16	.24	.40	.60	.75	1.00	1.50	1.75	2.00

LIGHT DESIGN

Number	0	1	2	3	4	5	6	7	8
Capacity ... inches	2	3	4	6	8	10	12	15	18
*Depth ... "	1½	2	2⅜	2½	2⅝	2¾	2⅞	3 1/16	3¼
Size of Screw ... "	½	⅝	¾	¾	¾	¾	⅞	⅞	⅞
Weight ... pounds	1¼	2½	4	6	7¼	8½	11½	14	18
Price, Complete ... each	1.75	2.00	2.25	2.75	3.25	3.75	4.25	5.50	7.00
" Extra Screws ... "	.50	.60	.70	.70	.70	.70	.90	.90	.90

*Center of screw to back.

FORGED PLANER AND SHAPER TOOLS

No. 1, LEFT-HAND SIDE TOOL

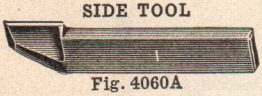


Fig. 4060A

No. 2, RIGHT-HAND SIDE TOOL

Fig. 4060B

No. 3, LEFT-HAND DIAMOND POINT

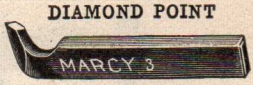


Fig. 4060C

No. 4, RIGHT-HAND DIAMOND POINT

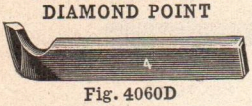


Fig. 4060D

No. 5, BULL NOSE FOR HEAVY CUTS

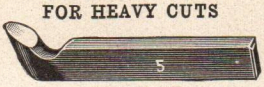


Fig. 4060E

No. 6, GOUGE NOSE TOOL

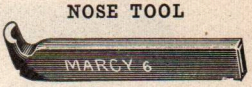


Fig. 4060F

No. 7, BROAD NOSE OR STOCKING TOOL

Fig. 4060G

No. 8, SCALING OR ROUGHING TOOL

Fig. 4060H

No. 9, RIGHT-HAND SIDING TOOL

Fig. 4060J

No. 10, LEFT-HAND SIDING TOOL

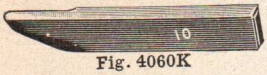


Fig. 4060K

No. 11, FOR FINISHING IN CORNERS

Fig. 4060L

No. 12 CUTTING-OFF TOOL

Fig. 4060M

No. 13, RIGHT-HAND BEVEL TOOL

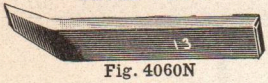


Fig. 4060N

No. 14, LEFT-HAND BEVEL TOOL

Fig. 4060P

No. 15, SMOOTHING TOOL FOR CAST IRON

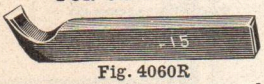


Fig. 4060R

No. 16, FOR SMOOTHING WROUGHT IRON OR STEEL

Fig. 4060S

Of all the tools used in a machine shop, none perform so important a part in the earning of a profit as lathe, planer and shaper tools, for they are the connecting link between the machines and the work being done.

An inferior tool, imperfect as to shape or temper, may be the means of reducing the profit more than the price of the highest grade tool obtainable.

Many kinds of tools have been devised for this kind of work, but none yet which can beat the solid forged tool if properly made of the right material. We furnish two grades of these tools — carbon steel tools for all ordinary purposes, made of a special analysis crucible tool steel, and high-speed tools for the severest kind of work, made of the highest grade of high-speed steel.

The lathe tools are made in twenty different styles, assembled in sets of ten, twelve, sixteen and twenty tools. The planer and shaper tools are made in sixteen styles, assembled in sets of twelve and sixteen tools.

CARBON STEEL

Set of 12 contains Nos. 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13 and 14. Set of 16 contains Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16.

Size.....inches	⅜x¾	½x1	⅝x1¼	⅝x1½	¾x1½	¾x1¾	1x2	1¼x2½
Price.....each	.50	1.00	1.50	2.25	2.50	3.00	4.50	8.00
" (12).....per set	6.00	12.00	18.00	27.00	30.00	36.00	54.00	96.00
" (16)..... "	8.00	16.00	24.00	36.00	40.00	48.00	72.00	120.00

HIGH SPEED STEEL

Size.....inches	½x1	⅝x1¼	⅝x1½	¾x1½	1x2
Price.....each	....	.....	.....	.....	.....

FORGED LATHE TOOLS

No. 1, LEFT-HAND SIDE TOOL

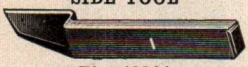


Fig. 4084A

No. 2, RIGHT-HAND SIDE TOOL

Fig. 4084B

No. 3, LEFT-HAND BENT SIDE TOOL

Fig. 4084C

No. 4, RIGHT-HAND BENT SIDE TOOL

Fig. 4084D

No. 5, LEFT-HAND DIAMOND POINT

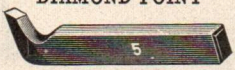


Fig. 4084E

No. 6, RIGHT-HAND DIAMOND-POINT

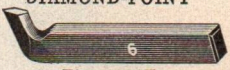


Fig. 4084F

No. 7, RIGHT-HAND BENT DIAMOND POINT

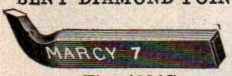


Fig. 4084G

No. 8, RIGHT-HAND HALF DIAMOND POINT

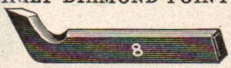


Fig. 4084H

No. 9, ROUND NOSE

Fig. 4084J

No. 10, WATER FINISHING TOOL

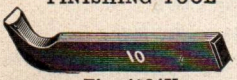


Fig. 4084K

No. 11, STRAIGHT CUTTING-OFF TOOL

Fig. 4084L

No. 12, BENT CUTTING-OFF TOOL

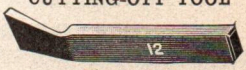


Fig. 4084M

No. 13, STRAIGHT THREAD TOOL

Fig. 4084N

No. 14, BENT THREAD TOOL

Fig. 4084P

No. 15, INSIDE TURNING TOOL

Fig. 4084R

No. 16, INSIDE THREAD TOOL

Fig. 4084S

No. 17 BULL NOSE TOOL

Fig. 4084T

No. 18, FINISHING OR NECKING TOOL

Fig. 4084U

No. 19, SCALING OR ROUGHING TOOL

Fig. 4084V

No. 20, FOR TRUEING UP CENTERS, ETC.

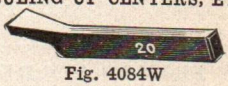


Fig. 4084W

CARBON STEEL

Set of 10, contains Nos. 1, 2, 6, 9, 5, 11, 13, 15, 16 and 19. Set of 12 contains Nos. 1, 2, 4, 5, 6, 9, 11, 13, 14, 15, 16 and 19. Set of 16 contains Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16 and 19. Set of 20 contains Nos. 1 to 20, as illustrated.

Size of Tool Inches	Price Each	Price, per Set — Number of Tools to Set: 10	12	16	20
1/4x 1/2	.34	3.40	4.08	5.44	6.80
5/16x 5/8	.34	3.40	4.08	5.44	6.80
3/8x 5/8	.50	5.00	6.00	8.00	10.00
3/8x 3/4	.50	5.00	6.00	8.00	10.00
1/2x1	1.00	10.00	12.00	16.00	20.00
5/8x1 1/4	1.50	15.00	18.00	24.00	30.00
5/8x1 1/2	2.00	20.00	24.00	32.00	40.00
3/4x1 1/2	2.20	22.00	26.40	35.20	44.00
3/4x1 3/4	2.70	27.00	32.40	43.20	54.00
1x2	4.20	42.00	50.40	67.20	84.00

HIGH SPEED STEEL—Prices upon Application

O. K. TOOL HOLDERS AND TOOLS

PLANER SET

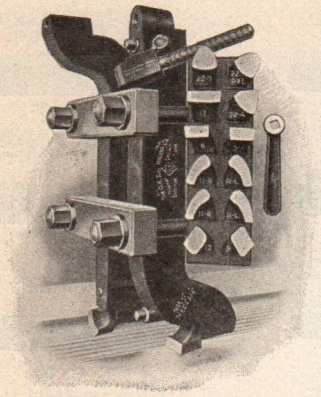


Fig. 5857A

BORING MILL SET

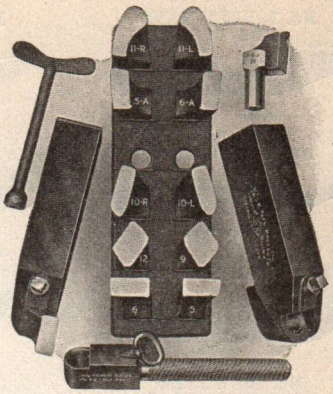


Fig. 5857B

STANDARD PLANER SETS, DOUBLE-END HOLDERS

Letter	C	D	E	F	G	H
Size ..... inches	¾x1½x12	1x1¾x15	1¼x2x18	1½x2½x24	1¾x3x24	2x3½x24
Price ..... per set	11.00	17.25	21.15	27.75	36.75	45.75

Sets C and D consist of a holder, block and twelve high speed steel tools, Nos. 11R 11L, 20, 10R, 10L, 6, 5, 9, 17, 12, 1 and 2.

Set E consists of holder, block and twelve tools, Nos. 11R, 11L, 20, 10R, 10L, 6A, 5A, 9, 17, 12, 1 and 2.

Sets F, G and H consist of holder, block, and twelve tools, Nos. 11R, 11L, 10R, 10L, 9, 12, 5, 6, 17, 22R and L, 22STR and 11L.

STANDARD PLANER HOLDERS, DOUBLE-END

Letter	C	D	E	F	G	H
Size ..... inches	¾x1½x12	1x1¾x15	1¼x2x18	1½x2½x24	1¾x3x24	2x3½x24
Price ..... per set	6.00	8.00	10.00	12.00	15.00	18.00

STRAIGHT PLANER HOLDERS (NO DROP), NUT ON FRONT OR BACK

Letter	C	D	E	F	G	H
Size ..... inches	¾x1½x12	1x1¾x15	1¼x2x18	1½x2½x24	1¾x3x24	2x3½x24
Price ..... per set	4.50	6.00	7.00	8.00	10.00	12.00

BORING MILL SETS, TYPE OKB

Price, Size F, 1¼x1¼ inches	per set	28.00
" " G, 1½x1½ "	"	38.00
" " H, 1¾x2 "	"	48.00

Complete, with pair of holders, right and left, twelve tools and hand grinding holder.

HOLDERS ONLY, TYPE OKB

Price, Size F, 1¼x1¼ inches	per pair	12.00
" " G, 1½x1½ "	"	16.00
" " H, 1¾x2 "	"	20.00

Holders to hold Sizes F, G and H tools are made to fit any size of boring mill at same price.

All sets larger than D are net as listed.

O. K. TOOL HOLDERS AND TOOLS

TOOLS AND FIXTURES

No.	Size	A	B	C	D	E	F	G	H
1	Left Side Tool	.30	.33	.40	.75	.90	1.25	1.75	2.25
2	Right " " Bent	.30	.33	.40	.75	.90	1.25	1.75	2.25
3	Left " Brass Tool	.30	.33	....	....	....	....	....	....
4	Right " " "	.30	.33	....	....	....	....	....	....
5	Left Offset Diamond Tool	.30	.33	.40	.75	.90	1.25	1.75	2.25
6	Right " " "	.30	.33	.40	.75	.90	1.25	1.75	2.25
7	" Side Parting Tool	.32	.35	.45	.90	....	....	....	....
8	Straight Brass Tool	.30	.33	.40	....	....	....	....	....
9	Left Diamond Point Tool	.30	.33	.40	.75	.90	1.25	1.75	2.25
10	Roughing Tool, Right and Left	....	....	.40	.75	.90	1.25	1.75	2.25
11	Hog Nose " " " "	....	.33	.40	.75	.90	1.25	1.75	2.25
12	Right Diamond Point	.30	.33	.40	.75	.90	1.25	1.75	2.25
13	Straight Thread Tools	.35	.40	.50	.85	1.25	....	....	....
14	Right " "	.35	.40	.50	.85	1.25	....	....	....
15	Female Radius, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{5}{32}$ in.	.55	.63	.75	1.25	2.00	....	....	....
16	Male " $\frac{3}{32}$, $\frac{1}{8}$, $\frac{5}{32}$ "	.55	.63	.75	1.25	2.00	....	....	....
17	Flat Nose Tool	.35	.40	.60	1.00	1.25	1.50	2.00	2.50
18	Inside Boring Fixture	.90	1.00	1.10	....	....	....	....	....
19	Knurling Fixture	1.40	3.00	3.00	....	....	....	....	....
20	Steel Finishing Tool for Shaper and Planer	....	....	.50	.75	.90	1.25	1.75	2.25
21	Bull Nose Roughing Tool	....	....	....	.85	.90	....	....	....
22	Round Nose Right and Left or Straight	....	....	.40	.75	1.25	1.50	2.00	2.50
23	Spotting Tool, Solid	....	....	.40	.75	....	....	....	....
23	" " for No. 18	.20	.25	.30	....	....	....	....	....
24	Inside Boring Tool	.20	.25	.30	....	....	....	....	....
25	" Threading Tool	.20	.25	.30	....	....	....	....	....
26	Thread Chasing "	....	....	1.50	2.00	....	....	....	....
27	Dovetail Tool	....	....	.50	.85	1.25	....	....	....

All the above cutters are made from the best high speed steel.
Sizes E to H inclusive, are net prices.

STANDARD LATHE HOLDERS

Letter	Size Inches	Height from Point of Tool to Bottom of Holder, Inches		Price Each
		Straight	Drop	
A	$\frac{3}{8}$x $\frac{3}{4}$	$1\frac{1}{16}$	$\frac{7}{8}$	1.80
B	$\frac{1}{2}$x1	$1\frac{3}{8}$	$1\frac{1}{8}$	2.00
C	$\frac{1}{2}$x1	...	$1\frac{3}{16}$	2.50
C	.....	...	$1\frac{1}{4}$	....
C	$\frac{5}{8}$x$1\frac{1}{4}$	$1\frac{5}{8}$	$1\frac{5}{16}$	2.50
D	$\frac{3}{4}$x$1\frac{3}{8}$	$2\frac{1}{16}$	$1\frac{5}{8}$	4.00
E	1 x$1\frac{3}{4}$	$2\frac{1}{2}$	$1\frac{13}{16}$	6.00
F	$1\frac{1}{4}$x2	$2\frac{5}{8}$	2	7.00
G	$1\frac{1}{2}$x2	$2\frac{3}{4}$	2	8.00
H	$1\frac{3}{4}$x$2\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{1}{2}$	10.00

Shaper holders are the same as lathe holders, with nut on back or front. Special prices for sizes not standard. These holders are made either straight or drop.
All holders larger than D are net as listed.

ARMSTRONG TOOLS

TOOL HOLDERS

STRAIGHT SHANK

Fig. 19239A

Armstrong Tools form a practical and economical system for the use of self-hardening and high-speed tool steel.

LEFT-HAND—OFFSET

Fig. 19239B

They save all forging and 70 per cent of grinding. Cutters made from stock size and shape of steel.

RIGHT-HAND—OFFSET

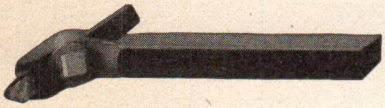


Fig. 19239C

Armstrong tools make 1 pound of tool steel equal to 10 pounds in ordinary forged tools.

Number: Left-hand	Number: Straight Shank	Number: Right-hand	Size of Holder Inches	Price Each
00-L	00-S	00-R	5/16x 3/4x 4 1/2	1.80
0-L	0-S	0-R	3/8x 7/8x 5	1.90
1-L	1-S	1-R	1/2x1 1/8x 6	2.15
2-L	2-S	2-R	5/8x1 3/8x 7	2.70
3-L	3-S	3-R	3/4x1 5/8x 8	3.60
4-L	4-S	4-R	7/8x1 3/4x 9	4.60
5-L	5-S	5-R	1 x2 x11	6.50
6-L	6-S	6-R	1 1/4x2 1/4x13	9.00
7-L	7-S	7-R	1 1/2x2 1/2x16	15.00
750-L	750-S	750-R	1 5/8x2 3/4x18	22.00
800-L	800-S	800-R	1 3/4x3 x20	28.50

EXTRA CUTTERS

No.	Size In. Sq.	Price Each	No.	Size In. Sq.	Price Each
00	3/16	.25	5	5/8	2.50
0	1/4	.30	6	3/4	4.10
1	5/16	.45	7	7/8	6.00
2	3/8	.65	750	1	8.60
3	7/16	1.00	800	1 1/8	11.90
4	1/2	1.45	...	...	.....

BORING TOOLS

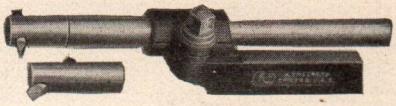


Fig. 19239D

Requires no forging or tempering and a very little grinding, always ready for use, very stiff, and will bore close up to a shoulder or bottom. Price includes holder and bar straight and 45-degree end caps, two high speed cutters and double head wrench, in individual box.

No.	Size of Shank Inches	Size of Bar Inches	Size of Cutter In. Sq.	Price Each
00B	5/16x 3/4	1/2x 8	3/16	3.25
8	3/8x 7/8	9/16x 9	3/16	3.25
9	1/2x1 1/8	3/4x11	1/4	3.85
10	5/8x1 3/8	15/16x13	5/16	5.10
11	3/4x1 5/8	1 1/8x16	3/8	7.25
12	7/8x1 3/4	1 5/16x18	7/16	10.75
13	1 x2	1 1/2x21	1/2	15.00

BORING TOOLS

WITH CLAMP TOOL REST

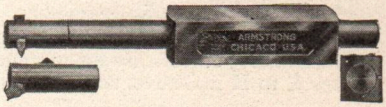


Fig. 19239E

The convenience and many practical advantages of this system of boring tools are known and appreciated in almost every modern machine shop.

Price includes holder and bar straight and 45-degree end caps, two high speed cutters and double head wrench.

No.	Size of Shank Inches	Size of Bar Inches	Size of Cutter In. Sq.	Price Each
108	3/4x 7/8	9/16x 9	3/16	2.75
109	1 x1 1/8	3/4x11	1/4	3.25
110	1 1/4x1 3/8	15/16x13	5/16	4.35
111	1 1/2x1 5/8	1 1/8x16	3/8	6.25
112	1 3/4x1 7/8	1 5/16x18	7/16	8.75
113	2 x2 1/8	1 1/2x21	1/2	11.50
114	2 1/4x2 3/8	1 13/16x24	5/8	15.00
115	2 3/4x2 7/8	2 1/4x30	3/4	20.25

ARMSTRONG TOOLS

BORING TOOL HOLDERS

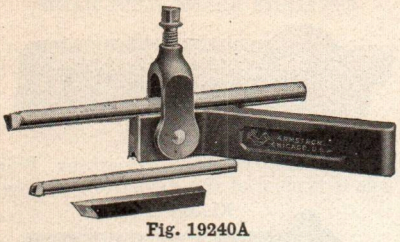


Fig. 19240A

This holder is reversible and can be used for right or left-hand.

Price includes holder, wrench, two boring bars and one high speed cutter.

No.	Size of Shank Inches	Size of Bars Inches	Size of Cutter In. Sq.	Price Each
15	3/8 x 3/4	1/8 and 1/4	1/4	**2.75**
16	1/2 x 1	3/16 " 5/16	5/16	**3.50**
17	5/8 x 1 1/4	1/4 " 3/8	3/8	**4.50**
18	3/4 x 1 1/2	5/16 " 7/16	7/16	**5.75**

THREE-BAR BORING TOOLS

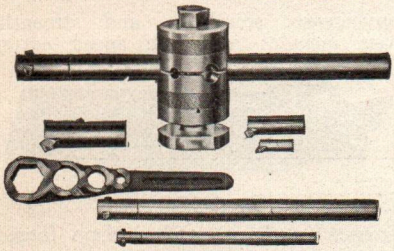


Fig. 19240B

Bars can be changed as needed almost instantly, this allowing the operator to use the stiffest bar possible for each job with the result that speeds and feeds can be increased, saving time.

Price includes holder, 3 bars with straight and 45 degree end caps, 6 high speed cutters and combination wrench.

No.	Diameter of Bar Inches	Size of Cutters In. Sq.	Price Each
1-B	1/2, 3/4 and 1 1/8	3/16, 1/4 and 3/8	**13.00**
2-B	9/16, 15/16 " 1 5/16	3/16, 5/16 " 7/16	**17.25**
3-B	3/4, 1 1/8 " 1 1/2	1/4, 3/8 " 1/2	**22.75**
4-B	15/16, 1 5/16 " 1 13/16	5/16, 7/16 " 5/8	**30.00**

An extra charge of 1.00 net will be made for tools ordered fitted to special dimensions.

ADJUSTABLE BORING TOOLS

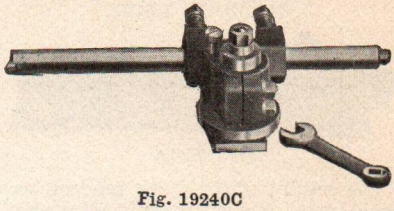


Fig. 19240C

This tool combines convenience, adjustability and rigidity to a remarkable degree, and is well adapted to a very wide range of work. The holder is easily adjustable to different heights and will hold bars of various diameters.

No.	Capacity of Holder, Diam. of Bar, Inches	Size of Bar Inches	Size of Cutter In. Sq.	Price Each
212	1/4 to 1 5/16	1 5/16 x 21	3/8	**16.50**
213	3/8 " 1 1/2	1 1/2 x 24	7/16	**21.75**
214	1/2 " 1 13/16	1 13/16 x 28	1/2	**29.00**
215	5/8 " 2 1/4	2 1/4 x 36	5/8	**41.25**

An extra charge of 50 cents net will be made for fitting bolt head to special dimensions.

THREADING TOOLS

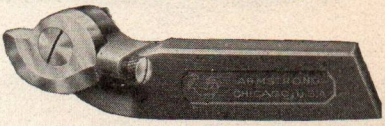


Fig. 19240D

The cutters require grinding on the top edge only to sharpen, and therefore remain true to form and of the correct angle, its use thus insures good thread, and saves much grinding.

No.	Size of Tool Inches	Price, Each, Complete With Carbon Steel Cutter	With High Speed Cutter
00T	5/16 x 3/4 x 5	**2.25**	**2.75**
50	3/8 x 7/8 x 5	**2.25**	**2.75**
51	1/2 x 1 1/8 x 6	**2.75**	**3.35**
52	5/8 x 1 3/8 x 7	**3.50**	**4.25**
53	3/4 x 1 5/8 x 8	**4.50**	**5.50**
54	7/8 x 1 3/4 x 9	**5.50**	**6.50**
55	1 x 2 x 10	**7.00**	**8.25**

Each tool is equipped with one single point cutter V, U. S., or Whitworth standard and one drop-forged wrench.

ARMSTRONG TOOLS

CUTTING-OFF TOOLS

STRAIGHT SHANK

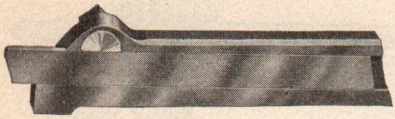


Fig. 19241A

The nature of the work renders occasional breaking of cutting-off tools unavoidable and in the case of forged tools this in-

LEFT-HAND OFFSET

Fig. 19241B

volves reforging and grinding, the lathe meanwhile standing idle. With Armstrong Cutting-off Tools the delay is but slight,

RIGHT-HAND OFFSET

Fig. 19241C

as the blade can be extended and point sharpened in a few minutes.

Number: Left-hand	Number: Straight Shank	Number: Right-hand	Size of Shank Inches	Price Each
29-L	19	29-R	5/16 x 3/4	1.90
30-L	20	30-R	3/8 x 7/8	2.00
31-L	21	31-R	1/2 x 1 1/8	2.40
32-L	22	32-R	5/8 x 1 3/8	3.00
33-L	23	33-R	3/4 x 1 5/8	4.00
34-L	24	34-R	7/8 x 1 3/4	5.00
35-L	25	35-R	1 x 2	6.50
36-L	26	36-R	1 1/4 x 2 1/4	7.75

EXTRA CUTTERS

No.	Size Inches	Price Each	No.	Size Inches	Price Each
29	5/64 x 1/2	.60	33	3/16 x 1	2.15
30	3/32 x 5/8	.65	34	3/16 x 1 1/8	2.90
31	1/8 x 3/4	.90	35	1/4 x 1 1/4	4.00
32	1/8 x 7/8	1.30	36	1/4 x 1 3/8	4.65

Prices include one high speed blade and a drop-forged wrench.

SIDE TOOLS

STRAIGHT SHANK—LEFT-HAND

Fig. 19241D

The design of the Armstrong Side Tools is typical of the Armstrong system

RIGHT-HAND

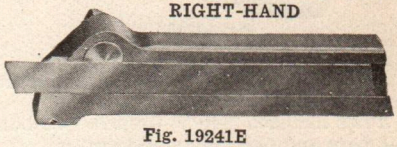


Fig. 19241E

of tool holders embodying the prime needs of a practical lathe tool, viz.;

OFFSET—LEFT-HAND

Fig. 19241F

convenience, simplicity, and strength, Price includes one high speed cutter

RIGHT-HAND

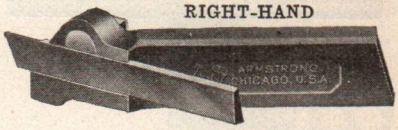


Fig. 19241G

(ground to shape) and a drop forged wrench.

Number: Straight Left-hand	Number: Straight Right-hand	Number: Offset Left-hand	Number: Offset Right-hand	Size Straight Shank Inches	Price Each
79-L	79-R	69-L	69-R	5/16 x 3/4	1.90
80-L	80-R	70-L	70-R	3/8 x 7/8	2.25
81-L	81-R	71-L	71-R	1/2 x 1 1/8	2.90
82-L	82-R	72-L	72-R	5/8 x 1 3/8	4.00
83-L	83-R	73-L	73-R	3/4 x 1 5/8	5.25
84-L	84-R	74-L	74-R	1 x 1 3/4	7.10
85-L	85-R	75-L	75-R	1 1/8 x 2	8.50
86-L	86-R	76-L	76-R	1 1/4 x 2 1/4	11.00
87-L	87-R	....	....	1 1/2 x 2 3/8	15.75

EXTRA CUTTERS

No.	Price Each	No.	Price Each	No.	Price Each
79	.60	82	2.30	85	6.00
80	.90	83	3.40	86	7.90
81	1.40	84	5.00	87	10.00

ARMSTRONG TOOLS

CUTTERS FOR ARMSTRONG TOOL HOLDERS

No. 1 LEFT-HAND TURNING TOOL

Fig. 19246A

No. 2 ROUND NOSE TURNING TOOL

Fig. 19246B

No. 3 RIGHT-HAND TURNING TOOL

Fig. 19246C

The illustrations show a few cutter shapes most commonly used in Armstrong Tool Holders. Shapes Nos. 1, 2, 3 and 8

No. 4 LEFT-HAND CORNER TOOL

Fig. 19246D

No. 5 THREADING TOOL

Fig. 19246E

No. 6 RIGHT-HAND CORNER TOOL

Fig. 19246F

are standard and can be furnished at regular prices for extra cutters. No. 8 is furnished as regular equipment.

No. 7 LEFT-HAND SIDE TOOL

Fig. 19246G

No. 8 SQUARE NOSE TOOL

Fig. 19246H

No. 9 RIGHT-HAND SIDE TOOL

Fig. 19246J

Special cutter forms and modifications of those shown will be suggested by the work to be done. Prices on application.

ARMSTRONG SPECIAL SELF-HARDENING STEEL

SQUARE

Fig. 19246K

ROUND

Fig. 19246L

FLAT

Fig. 19246M

FURNISHED IN 3-FOOT BARS

SQUARES

For use in turning an boring tools.

Size Square Inches	Price per Bar	Size Square Inches	Price per Bar	Size Square Inches	Price per Bar
3/16	1.20	7/16	5.60	7/8	21.30
1/4	2.00	1/2	7.10	1	28.20
5/16	3.00	5/8	11.10	1 1/8	34.35
3/8	4.25	3/4	15.80	...	.....

FLATS

For use in planer and slotter tools.

Size Inches	Price per Bar	Size Inches	Price per Bar	Size Inches	Price per Bar
1/4x3/8	3.10	1/2x11/16	10.35	3/4x1	20.65
5/16x7/16	4.25	1/2x3/4	11.00	7/8x1 1/8	27.30
3/8x1/2	5.85	9/16x3/4	12.00	.....	.....
7/16x9/16	8.15	5/8x7/8	15.60	.....	.....

ROUNDS

For use in turning tools.

Diam. Inches	Price per Bar	Diam. Inches	Price per Bar	Diam. Inches	Price per Bar
1/4	1.65	3/8	3.35	1/2	5.65
5/16	2.40	7/16	4.45	5/8	8.80

BEVEL

Fig. 19246N

SPECIAL

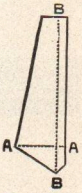


Fig. 19246P

BEVELS

For use in cutting-off tools.

Size Steel Inches	Price per Bar	Size Steel Inches	Price per Bar	Size Steel Inches	Price per Bar
5/64x1/2	2.40	1/8x 7/8	3.75	1/4x1 1/4	9.25
3/32x5/8	2.40	3/16x1	6.00	1/4x1 3/8	9.60
1/8x3/4	3.55	3/16x1 1/8	6.60	.....	....

SPECIALS

For use in side tools. Prices on application.

FILES

MILL BASTARD

Fig. 1637A

MILL BASTARD, ONE ROUND EDGE

Fig. 1637B

MILL BASTARD, TWO ROUND EDGES

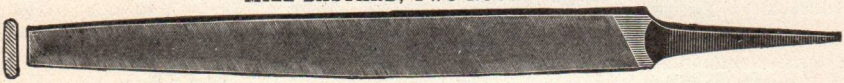


Fig. 1637C

MILL SECOND CUT

Fig. 1637D

MILL DOUBLE CUT, SECOND CUT

Fig. 1637E

CROSS CUT

Fig. 1637F

CANT SAW

Fig. 1637G

BAND SAW SLIM BLUNT, SINGLE CUT

Fig. 1637H

FILES AND RASPS

HALF ROUND CABINET FILE

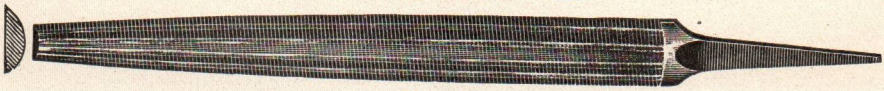


Fig. 5565A

PLANER KNIFE FILE

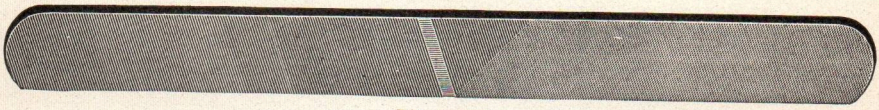


Fig. 5565B

HALF ROUND CABINET RASP

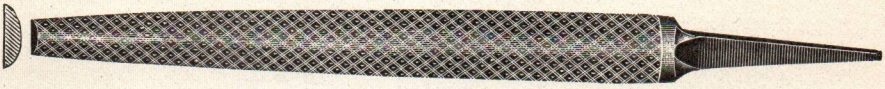


Fig. 5565C

FLAT SHOE RASP

Fig. 5565D

HALF ROUND SHOE RASP

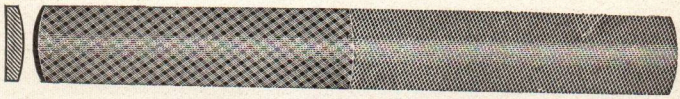


Fig. 5565E

HORSE RASPS

PLAIN RASP

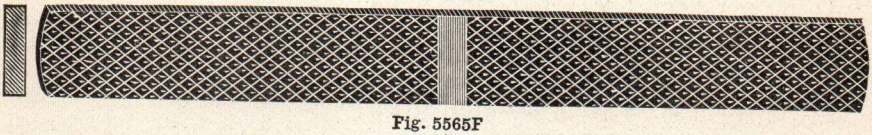


Fig. 5565F

TANGED RASP

Fig. 5565G

FILES

PRICE, PER DOZEN

Length Inches	Mill One Round Edge			Mill Two Round Edges		
	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth
4	3.40	3.90	4.40	3.80	4.40	4.90
5	3.60	4.30	4.60	4.00	4.80	5.10
6	3.90	4.50	5.10	4.40	5.00	5.60
7	4.40	5.20	5.50	4.90	5.80	6.10
8	4.80	5.50	6.10	5.40	6.10	6.80
9	5.50	6.50	7.10	6.10	7.30	7.90
10	6.30	7.20	7.90	7.00	8.00	8.80
11	7.50	8.80	9.60	8.40	9.80	10.60
12	8.40	9.70	10.60	9.40	10.80	11.80
13	10.60	12.00	13.20	11.80	13.40	14.60
14	12.00	13.70	14.70	13.40	15.30	16.40
15	14.70	16.90	18.10	16.40	18.80	20.10
16	16.50	18.90	20.10	18.40	21.00	22.40
17	20.50	22.70	24.40	22.80	25.30	27.10
18	22.70	25.50	27.30	25.30	28.40	30.40

Length Inches	Tapers		Slim Tapers		Band Saw Blunt and Taper	
	Single Cut	Double Cut	Single Cut	Double Cut	Regular	Slim
3	2.10	2.50	2.10	2.50	2.50	2.50
3½	2.10	2.50	2.10	2.50	2.50	2.50
4	2.20	2.90	2.20	2.60	2.90	2.60
4½	2.40	3.10	2.30	3.00	3.10	3.00
5	2.60	3.50	2.50	3.20	3.50	3.20
5½	3.00	4.00	2.90	3.50	4.00	3.50
6	3.40	4.70	3.10	3.90	4.70	3.90
7	4.30	5.60	3.80	4.50	5.60	4.50
8	5.40	6.70	4.50	5.30	6.70	5.30
9	6.60	8.10	5.40	6.30	8.10	6.30
10	8.10	9.70	6.40	7.50	9.70	7.50
11	10.70	12.10	8.30	9.10	12.10	9.10
12	12.50	14.70	9.50	11.00	14.70	11.00
13	15.90	17.50	12.10	13.10	17.50	13.10
14	18.20	20.60	13.80	15.40	20.60	15.40

Length Inches	Pit Saw	Cant Saw	Cross-cut	Hook Tooth	Planer Knife	Inserted Tooth or Chisel Tooth
	Single Cut	Single Cut	Single Cut	Single Cut	Single Cut	
4	4.80	4.30	4.80	....	....	....
5	5.40	4.70	5.40	....	....	....
6	6.10	5.40	6.10	6.70	....	....
7	7.00	6.10	7.00	7.70	....	....
8	7.50	6.40	7.50	8.30	6.40	8.30
9	8.50	7.80	8.50	9.40	....	9.40
10	9.10	8.70	9.10	10.10	8.60	10.10
11	10.70	10.40	10.70	11.80	....	....
12	11.80	11.40	11.80	13.00	12.10	....

Climax, Advance 2 inches on Half-Round Bastard
Round Gulleting, take Pit Saw Price

Length Inches	Knife			Patent Double Ender with Handle
	Bastard	2d Cut	Smooth	
4	5.40	6.10	6.40	.....
5	6.10	6.70	7.10	.....
6	6.90	7.50	7.90	3.50
7	7.80	8.50	8.90	3.50
8	8.50	9.10	9.50	3.90
9	9.40	10.60	11.30	4.40
10	10.10	11.50	12.30	4.90
11	12.20	13.70	14.60	.....
12	13.70	15.20	16.10	.....
13	16.30	17.90	19.20	.....
14	18.20	19.90	21.20	.....

FILES

PRICE, PER DOZEN

Length Inches	Mill and Round			Flat			Square		
	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth
4	3.00	3.50	3.90	3.70	4.30	4.70	3.80	4.60	4.90
5	3.20	3.80	4.10	3.90	4.60	4.90	4.10	4.80	5.30
6	3.50	4.00	4.50	4.30	4.80	5.30	4.60	5.10	5.50
7	3.90	4.60	4.90	4.80	5.50	6.10	5.10	5.80	6.30
8	4.30	4.90	5.40	5.30	6.10	6.60	5.50	6.30	7.00
9	4.90	5.80	6.30	6.30	7.20	7.90	6.60	7.70	8.30
10	5.60	6.40	7.00	7.00	8.10	8.70	7.40	8.50	9.10
11	6.70	7.80	8.50	8.60	9.80	10.70	9.10	10.40	11.30
12	7.50	8.60	9.40	9.70	11.00	12.10	10.20	11.50	12.80
13	9.40	10.70	11.70	11.80	13.60	14.70	12.50	14.30	15.40
14	10.70	12.20	13.10	13.30	15.30	16.70	13.90	16.10	17.50
15	13.10	15.00	16.10	16.00	18.30	20.00	16.90	19.20	20.90
16	14.70	16.80	17.90	17.80	20.10	22.30	18.70	21.20	23.30
17	18.20	20.20	21.70	21.50	24.20	26.50	22.50	25.40	27.50
18	20.20	22.70	24.30	23.90	26.80	29.20	25.10	28.20	30.40
19	24.60	27.50	29.40	28.40	31.60	34.60	29.70	33.20	35.70
20	27.40	30.70	32.90	31.50	35.30	38.30	32.80	36.70	39.30

Mill Blunt, Double Cut . . Advance 2 in.
" Double Cut . . . . . " 1 "
" Narrow Point . . . . . " 1 "
" Machine . . . . . " 1 "
" Triangular and Sq . . . " 1 "
Farmers' Own, Advance on Bast. 1 "

Cant (Blunt) Double Cut
Advance 2 inches

Square Blunt
Advance 1 inch

Length Inches	Hand and Pillar			Half-Round and Three Square			Warding		
	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth
4	3.70	4.30	4.80	4.80	5.60	6.10	4.00	4.80	5.40
5	3.90	4.70	5.30	5.40	6.10	6.40	4.50	5.30	5.80
6	4.30	5.10	5.60	6.10	6.70	7.10	4.90	5.90	6.40
7	4.90	5.80	6.30	7.00	7.70	8.20	5.90	6.90	7.50
8	5.40	6.30	6.70	7.50	8.30	8.90	6.40	7.50	8.20
9	6.70	7.80	8.30	8.50	9.40	9.90	7.80	9.00	9.90
10	7.50	8.70	9.40	9.10	10.10	10.70	8.70	10.10	11.00
11	9.40	10.90	11.80	10.70	11.80	12.70	10.90	12.70	13.70
12	10.70	12.30	13.50	11.80	13.00	13.90	12.30	14.30	15.40
13	13.30	15.20	16.20	14.10	15.40	16.60	15.20	17.40	18.70
14	15.00	17.00	18.20	15.50	17.00	18.30	17.00	19.40	21.00
15	17.90	20.60	21.70	18.50	20.40	21.70			
16	20.10	22.80	24.20	20.60	22.50	24.20			
17	24.20	27.10	28.60	24.70	27.00	28.90			
18	26.80	29.90	31.50	27.50	29.90	32.00			
19	31.90	35.40	37.60	32.80	35.70	38.10			
20	35.10	39.20	41.60	36.20	39.40	42.30			

Slotting (Blt) . . . . . Advance 2 in.
Cotter Blunt or Taper . . . . " 2 "
Reaper . . . . . Advance 1 inch on 2d Cut

Gin Saw . . . . . Take Bastard Price
Crossing . . . . . Advance 2 in.
Tumbler . . . . . " 2 "
Feather Edge (Blt) . . " 2 "
High Back } . . . . . " 2 "
Half-Round }

Stave-saw

8-inch 9.40

Stave-saw Improved

6-inch 6.40
7 " 7.40
8 " 8.10
9 " 9.70
10 " 10.70
12 " 15.40

FILES AND RASPS

PRICE, PER DOZEN

Length Inches	Horse Rasps			File Rasps		Wood Files		
	Plain	Beveled and ¾ Rasp	Tanged	Flat	Half-Round	Flat	Half-Round	Cabinet
6	.....	.....	.....	7.40	8.10	4.30	6.10	8.10
7	.....	.....	.....	8.60	9.30	4.80	7.00	9.30
8	.....	.....	.....	9.40	10.10	5.30	7.50	10.10
9	.....	.....	.....	11.40	12.20	6.30	8.50	12.20
10	9.40	10.70	12.80	12.80	13.70	7.00	9.10	13.70
11	11.40	12.90	15.20	15.50	16.80	8.60	10.70	16.80
12	12.80	14.40	16.80	17.50	18.70	9.70	11.80	18.70
13	15.20	17.00	19.60	20.90	22.40	11.80	14.10	22.40
14	17.80	20.10	23.10	23.20	24.80	13.30	15.50	24.80
15	20.90	23.60	27.30	27.80	29.70	16.00	18.50	29.70
16	24.40	27.50	32.20	30.80	32.90	17.80	20.60	32.90
17	28.90	31.50	.....	36.20	38.90	21.50	24.70	38.90
18	32.90	36.20	.....	40.90	43.60	23.90	27.50	43.60

Length Inches	Wood Rasps			Shoe Rasps		
	Flat	Half-Round	Cabinet	Flat	Half-Round	Oval
6	7.40	8.10	10.10	8.10	8.10	9.30
7	8.60	9.30	11.70	9.30	9.30	10.10
8	9.40	10.10	12.80	10.10	10.10	12.20
9	11.40	12.20	15.50	12.20	12.20	13.70
10	12.80	13.70	17.50	13.70	13.70	16.80
11	15.50	16.80	20.70	16.80	16.80	18.70
12	17.50	18.70	22.80	18.70	18.70	22.40
13	20.90	22.40	26.80	22.40	22.40	.....
14	23.20	24.80	29.60	24.80	24.80	.....
15	27.80	29.70	33.90	.....	.....	.....
16	30.80	32.90	36.90	Lastmakers' Rasps		
17	36.20	38.90	42.40			
18	40.90	43.60	46.90	1 inch Advance on Cabinet Rasps		

Sizes below 4 inches, not extended, take 4-inch price.

Half inches not specified, take next higher full inch price.

Dead Smooth, double the price of Bastard Cut.

One Round Edge, advance 12½ per cent.

All lengths above those listed, advance 20 per cent on next lower inch price.

Blunt Files not specified, advance 1 inch on respective kinds and cuts.

Single or Float Cut not specified, on regular shapes take Double Cut price.

Equalings (Bellied), advance 2 inches on respective kinds and cuts.

Two Round Edges, advance 25 per cent.

Files varying from standard sizes, subject to special prices.

Cuts not specified, made upon regular blanks, advance 1 inch on respective kinds and nearest cut.

VIXEN FILES

FLAT

Fig. 8583A

PILLAR

Fig. 8583B

HALF-ROUND, COMPLETE, WITH BACK AND HANDLE

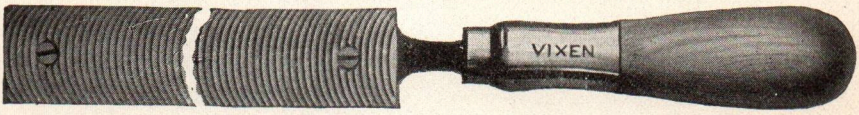


Fig. 8583C

The flat Vixen Files are now made in the ordinary tang pattern, conforming very closely in size to the ordinary file, and do not require the special back and handle as heretofore. This applies to the flat files only, the half-round files still being made in the original pattern requiring the special back and handle.

Vixen Regular Cut corresponds to ordinary bastard cut and used on all classes of rough work—cast iron, soft steel, copper, brass, aluminum and soft metals. Also excellent for wood, slate, marble, fiber, rubber, etc.

Vixen Fine Cut should be used on all work where ordinary bastard and second cut files are used, such as hard metals—steel, cast iron, phosphor-bronze, white brass, etc.

Vixen Smooth Cut is used where amount of metal to be removed is slight and also where superior finish is desired. Excellent for lathe work.

Vixen Dead-smooth Cut is for die and tool work and finishing hard metals.

Vixen Utility File has regular cut on one side and smooth on the other. Valuable as equipment for automobile, motor boat, machinist's kit, household tool chest, etc.

Vixen Babbitt Files are coarser than regular cut.

PRICE, PER DOZEN—IN EFFECT SEPTEMBER 1, 1917

Description	Flat Pillar and Flexible						Half-Round					
Size.....inches	8	10	12	14	16	18	8	10	12	14	16	18
Regular (Bastard)..	10.50	13.10	15.80	18.90	22.60	27.30	8.50	10.50	12.90	15.60	18.80	23.00
Fine (2nd Cut).....	12.60	15.20	17.90	21.00	24.70	29.40	10.00	12.00	14.40	17.10	20.30	24.50
Smooth.....	13.70	16.30	18.90	22.00	25.70	30.40	10.80	12.80	15.20	17.90	21.10	25.30
Dead-smooth.....	14.70	18.40	22.00	26.20	29.90	34.60	11.80	14.80	18.20	21.90	25.10	29.30
Utility.....	12.00	14.70	17.30	20.50	24.00	.....	.....	.....	.....	.....	.....	.....
Babbitt.....	.....	.....	19.40	21.50	.....	.....	.....	.....	.....	.....	.....	.....
Resharpening.....	1.10	1.30	1.60	1.90	2.30	2.70	1.10	1.30	1.60	1.90	2.30	2.70
Surface Holders....	12.00	12.00	13.50	13.50	15.00	15.00	12.00	12.00	13.50	13.50	15.00	15.00
Backs.....	6.00	6.50	7.00	7.50	8.00	8.50	6.00	6.50	7.00	7.50	8.00	8.50
*Bolts and Nuts. per doz. sets	2.00	2.00	2.00	2.50	2.50	2.50	2.00	2.00	2.00	2.50	2.50	2.50

*2 bolts and 2 nuts in one set.

RESHARPENING

The Vixen File after becoming dulled may be resharpened from four to six times, depending upon the grade of cut, (number of teeth per inch) and how much the teeth have been worn after becoming dull. Transportation charges to be paid by the customer.

FILE CARDS, HANDLES, ETC.

PHOENIX FILE CARDS

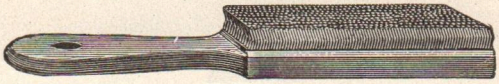


Fig. 12464A

Price, No. 1, Black Enameled Handle, Steel Wire Set in Leather.....	per gross	28.00
" " 2, Same as No. 1, but with Plain Whitewood Handle.....	"	24.00

FILE CARDS

FILE CARD

Fig. 12464B

Price, with Scorer....per dozen .....

FILE CARD AND BRUSH

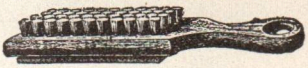


Fig. 12464C

Price, with Scorer....per dozen ....

FILE HANDLES

Fig. 12464D

IXL FILE AND TOOL HANDLE

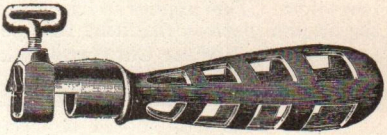


Fig. 12464E

No. 1, small.....	per gross	5.00
" 2, medium.....	"	5.50
" 3, large.....	"	6.00
" 4, assorted.....	"	6.50
IXL File and Tool Handle	per dozen	1.75

SURFACE FILE HOLDERS

Fig. 12464F

Price, No. 4	each	....
" " 5.....	"	....

MACHINISTS' SCRAPERS

Fig. 12464G

Fig. 12464H

Price, Assorted Shapes, Handled.....	per set of 6	2.75

LENOX HACK SAW BLADES

THE BLADE IN THE PLAID BOX

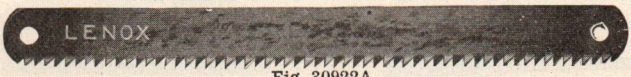


Fig. 30922A

Uniform service. Free smooth rapid cuts. They retain a cutting edge. Economical with profit. Do not be afraid to use Lenox Heavy Power Blades at high speed. Hand and light power blades should not run faster than 45 to 50 strokes.

FOR HAND FRAMES

ALL HARD OR FLEXIBLE

Length Inches	Width Inches	Thickness Gauge	Price per Gross
8	½	.025 or 23	**8.00**
9	½	.025 " 23	**9.00**
10	½	.025 " 23	**10.00**
11	½	.025 " 23	**11.00**
12	½	.025 " 23	**12.00**
	9/16	.028 " 22	**12.60**
14	9/16	.028 " 22	**15.00**
	⅝	.028 " 22	**16.20**
16	⅝	.032 " 21	**19.20**
17	⅝	.032 " 21	**20.40**
	¾	.032 " 21	**22.95**
18	⅝	.032 " 21	**21.60**
	¾	.032 " 21	**24.30**

FOR LIGHT POWER MACHINES

8	9/16	.028 or 22	**9.00**
9	9/16	.028 " 22	**9.60**
	⅝	.028 " 22	**9.60**
10	⅝	.028 " 22	**10.20**
	⅝	.032 " 21	**12.00**
	¾	.032 " 21	**13.50**
12	⅝	.028 " 22	**12.60**
	⅝	.032 " 32	**14.40**
	¾	.032 " 21	**16.20**
..	1	.032 " 21	**22.80**
14	⅝	.032 " 21	**16.80**
	¾	.032 " 21	**18.90**
	1	.032 " 21	**26.60**
16	¾	.032 " 21	**21.60**
	1	.032 " 21	**30.40**
17	¾	.032 " 21	**22.95**
	1	.032 " 21	**32.30**

FOR HEAVY POWER MACHINES

Length Inches	Width Inches	Thickness Gauge	Price per Gross
10	¾	.049 " 18	**19.50**
	1	.049 " 18	**24.50**
12	¾	.049 " 18	**23.40**
	1	.049 " 18	**29.40**
14	¾	.049 " 18	**27.30**
	1	.049 " 18	**34.30**
	1¼	.049 " 18	**44.10**
	1	.065 " 16	**44.10**
	1¼	.065 " 16	**59.50**
16	¾	.049 " 18	**31.20**
	1	.049 " 18	**39.20**
	1¼	.049 " 18	**50.40**
	1	.065 " 16	**50.40**
	1¼	.065 " 16	**68.00**
17	1	.049 " 18	**41.65**
	1¼	.049 " 18	**53.55**
	1	.065 " 16	**53.55**
	1¼	.065 " 16	**72.25**
	1½	.065 " 16	**85.00**
18	1	.049 " 18	**44.10**
	1¼	.049 " 18	**56.70**
	1	.065 " 16	**56.70**
	1½	.065 " 16	**90.00**
20	1	.049 " 18	**49.00**
	1½	.049 " 18	**83.00**
	1	.065 " 16	**63.00**
	1½	.065 " 16	**100.00**
22	1	.049 " 18	**53.90**
	1½	.049 " 18	**91.30**
	1	.065 " 16	**69.30**
	1½	.065 " 16	**110.00**
24	1	.049 " 18	**58.80**
	1½	.049 " 18	**99.60**
	1	.065 " 16	**75.60**
	1½	.065 " 16	**120.00**

HACK SAW TABLE

Materials to be Cut	In Hand Frame Hard	In Hand Frame Flexible	By Machine 90-120 Strokes per Min Medium	By Machine 90-120 Strokes per Min Heavy	By Machine 90-120 Strokes per Min Ex. Heavy
Light Angles	24	24	14–18	..	..
Heavy "	14	18	14	14	..
Light Struct	18	14	14	14–10	10 pt.
Heavy "	18	..	14	10	7–10 pt.
Iron, Conduit or Brass Pipe	24	24	18	18	..
Cold-rolled Machine Steel	18	14	10	10	7–10 pt.
Tool Steel or Cast Iron	14–18	18	14	14	7–10 pt.
Brass	18	18	14	14	..
Thin Sheet Metal	32–24	32-24	..	..	..
Light Tubing	32	32	..	..	..
Railway Rails	14–18	..	..	..	..

HACK SAW FRAMES

CAST IRON

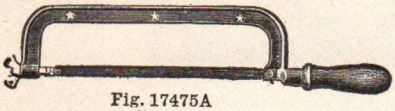


Fig. 17475A

NATURAL FINISHED

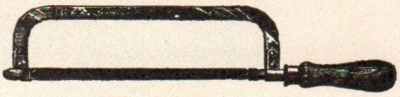


Fig. 17475B

Number	4A	4B	4C	4D	8	9	10
Length of Blade ....inches	8	9	10	12	8	9	10
Price ....each	.40	.45	.45	.45	1.90	1.40	1.60

Nos. 4A to 4D have stained hardwood handles, black enameled frame. Nos. 8 to 10 have natural finished steel frame, enameled handles.

NICKEL-PLATED

Nos. 17 TO 20

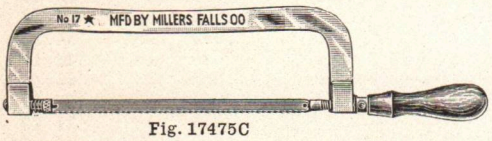


Fig. 17475C

Nos. 65 TO 68

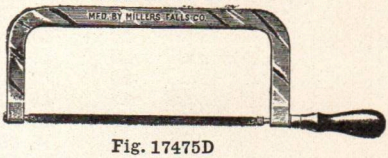


Fig. 17475D

Number	17	18	20	65	66	14	68
Length of Blade .... inches	9 and 10	11 and 12	8 and 9	10	12	12	14
Depth under Back... "	3	3	3⅛	3½	3½	5¼	5¼
Price.... each	1.80	1.90	1.30	....	....	3.75	....

All frames ¼ and 1-inch steel, nickel-plated. Nos. 17 to 20 are sway-backed.

ADJUSTABLE

Nos. 9, 27 AND 49

Fig. 17475E

Nos. 10 AND 11

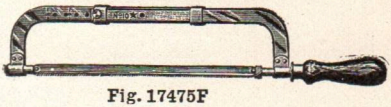


Fig. 17475F

Number	9	27	49	10	11
Length of Blades....inches	8 to 12	8 to 12	8 to 12	8 to 12	8 to 12
Depth under Back .... "	2¾	3¼	3⅜	2⅜	3½
Price ....each	1.40	1.25	1.50	1.60	1.65

RAIL SAW

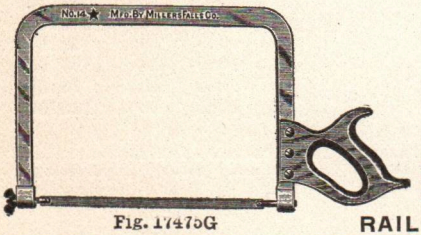


Fig. 17475G

No. 12 UNIVERSAL "EASY GRIP"

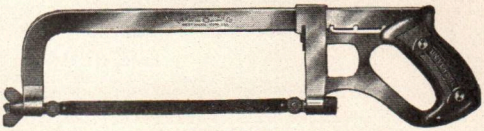


Fig. 17475H

RAIL SAWS

Number	1	1½	2	3	4	5	6
Length of Blade....inches	9	12	12	14	17	18	20
Depth under Back.... "	7	7	10	10	10	10	10
Price.... each	1.25	1.35	1.50	1.65	2.00	2.40	2.75

Nos. 4, 5 and 6 have two handles.

No. 12 "EASY GRIP"

Extends from 8 to 12 inches; frame, 3⅛ inches deep. Price, each, 1.50.

STARRETT HACK SAW FRAMES

No. 140

Fig. 17534A

Spring plungers overlap the ends of the saw, automatically holding it in its proper place. By a slight push the saw may be instantly removed, furnishing a most convenient way for attaching or detaching.

Price, with 8-inch Blade.....each **.90**

No. 145

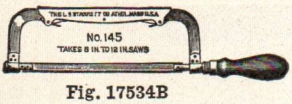


Fig. 17534B

This adjustable or extension back frame has improved spring pawls which securely hold the frame to receive saws of various lengths. They are neither too light nor too heavy, and are finely finished and nickel-plated. Holds 8 to 12-inch saws.

Price, with 8-inch Blade.....each **1.25**

No. 141

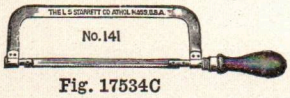


Fig. 17534C

The steel frame is extremely stiff, the stock being wider than that commonly used. It will not be cramped by straining the blade. Saws may be set to cut in any one of four directions.

Length..inches	8	9	10	11	12
Price.....each	.70	.75	.80	.85	.90

No. 489

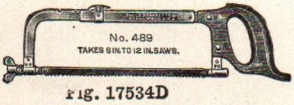


Fig. 17534D

Same design as the No. 147, but made from slightly heavier stock, and with Easy Grip hardwood handle. Can be set to cut in all four directions. Desired tension obtained by turning the wing nut. Takes 8 to 12-inch blades.

Price, with 8-inch Blade.....each **1.50**

No. 147

Fig. 17534E

The back of this frame is made from No. 16 gauge tubing, and is stiff and rigid. Adjustments can be made to accommodate saws, 8, 9, 10, 11 and 12 inches in length. May be set to cut in any one of four directions.

Price, with 8-inch Blade.....each **1.25**

No. 146

Fig. 17534F

A well-made frame with adjustable back. Will take 8, 9, 10, 11 and 12-inch saws, which may be set to cut in any one of four directions, and easily tightened by simply turning the handle. Will not tremble when used. Polished and nickel-plated.

Price, with 8-inch Blade.....each **1.00**

No. 142

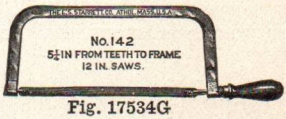


Fig. 17534G

With hardwood handle. For cutting girders, beams, steel rails, etc. Takes 12-inch saws only. Depth from teeth of saw to inside edge of frame, 5¼ inches. Nickel-plated.

Price, with One Blade.....each **1.50**

No. 148

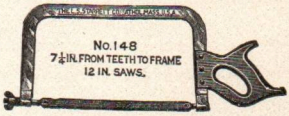


Fig. 17534H

For cutting girders, beams, steel rails, etc. With hardwood handle. Takes 12-inch saws only. Depth from teeth of saw to inside edge of frame, 7¼ inches. Nickel-plated.

Price.....each **1.85**

STARRETT HACK SAW BLADES

FLEXIBLE BACK HACK SAWS

No. 250
WITH REGULAR TEETH
18 TO THE INCH

Fig. 21887A

No. 252
WITH FINE TEETH
24 TO THE INCH

Fig. 21887B

No. 258
WITH EXTRA FINE TEETH
32 TO THE INCH

Fig. 21887C

These saws are made of the finest grade of steel especially adapted to the purpose, hardened and tempered on the cutting edge only, with flexible or soft back. Plumbers, gas fitters and electrical workers will find these blades particularly adapted for their work.

Length.....inches	6	7	8	9	10	11	12
Width..... "	7/16	7/16	7/16	7/16	1/2	1/2	1/2
Thickness..... "	.025	.025	.025	.025	.025	.025	.025
Price.....per gross	**7.00**	**7.50**	**8.00**	**9.00**	**10.00**	**11.00**	**12.00**

HACK SAW CHART

For most satisfactory results use saws referred to below:

Material to be Cut	Number of Blades: For Hand Frames — All Hard	For Hand Frames — Flexible or Soft Black	For Power Machines — Light Machine	For Power Machines — Medium Machine	For Power Machines — Heavy Machine	For Power Machines — Extra Heavy Machine
Light Angles " Channels " Tee Iron " Ornamental	102	252	115	262	....	....
Heavy Angles " Channels " Tee Iron	103 112	250	115B	255	....	....
Light Structural	112B	....	....	255	254	256
Heavy "	112B	....	....	255B	254B	256B
Iron Pipe Conduit Pipe Brass "	102	252	115	262	259	....
Solid Stock Cold Rolled Machine Steel	103B 112B	250 250B	114	255B 255C	254B 254C	256B 256C
Tool Steel Cast Iron	103 112	....	114	255	254	256
Brass	103 112	....	115	262	259	....
Sheet Metal Less than 18 Gauge	253	258	....	....	....	....
" " Over 18 Gauge	102	252	....	....	....	....

PLIERS, NIPPERS AND WIRE CUTTERS

No. 130 GAS AND BURNER PLIERS

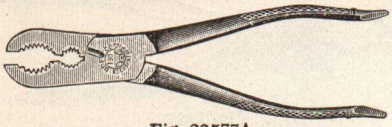


Fig. 23577A

In grasping large pipe, a firm grip is secured with slight pressure on handles. Provided with wire cutter and can be used as a wrench.

Length....inches	5	6	7
Price....per doz.	**10.80**	**12.00**	**13.20**
Length....inches	8	10	.....
Price....per doz.	**14.40**	**16.80**	.....

No. 108 BERNARD GAS PLIERS

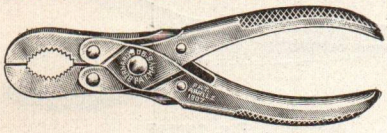


Fig. 23577B

Has an efficient grip for pipe or hollow tubing.

Length.....inches	5	6
Price.....per dozen	**10.50**	**13.50**

No. 110 BERNARD GAS AND CUTTING PLIERS

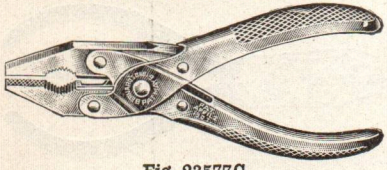


Fig. 23577C

An all-round plier with many uses for home and office.

Length.....inches	5½
Price.....per dozen	**16.50**

Nos. 357 AND 557 COMBINATION PLIERS

Fig. 23577D

Gas pliers, wire cutters, wrench and screwdriver combined. No. 357, nickel-plated; No. 557, black finish.

Length...in.	5	6	8	10
No. 557.per doz.	**13.50**	**13.50**	**16.00**	**18.00**
" 357 "	**15.00**	**15.00**	**18.00**	**21.00**

No. 60 BULLDOG END CUTTING NIPPERS

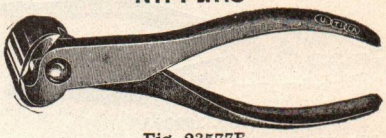


Fig. 23577E

Used by carpenters, shoemakers, machinists and other mechanics who desire a high-grade end cutting nipper.

Length.inches	5	6	7	8
Price.per doz.	**12.60**	**14.60**	**17.20**	**19.20**

No. 65 JEWELERS' END CUTTING NIPPERS

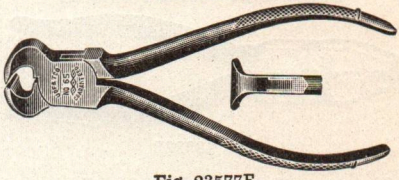


Fig. 23577F

A light, strong, end cutting nipper, used by jewelers, opticians, electricians and machinists. The handles are checkered, not knurled.

Length....inches	4	4½	5
Price...per dozen	**15.50**	**17.50**	**18.50**

No. 3 COMPOUND END CUTTING NIPPERS

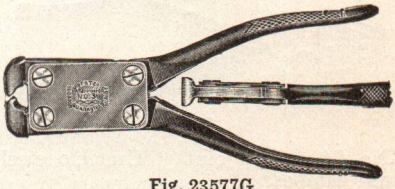


Fig. 23577G

For use by toolmakers, machinists, jewelers, florists, piano and spring bed manufacturers, bicycle and typewriter makers, and repairmen in general. Handles are checkered.

Length...in.	4½	5½	7½	9
Price.per dozen	**20.40**	**21.85**	**26.20**	**31.80**

CAREW PATTERN WIRE CUTTERS

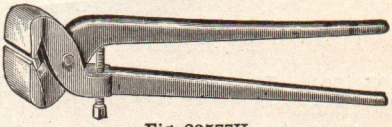


Fig. 23577H

Length...in.	8	10	12	14
Price.per dozen	**24.00**	**27.00**	**31.20**	**36.00**

PEXTO PLIERS

SIDE CUTTING PLIERS

Fig. 18222A

No. 30. Box joint. Gun barrel handles, knurled.

Length....inches	5	6	7
Price....per doz.	**12.50**	**13.50**	**17.00**
Length....inches	8	9	.....
Price....per doz.	**20.00**	**35.00**	.....

SIDE CUTTING PLIERS

Fig. 18222B

No. 40. Lap joint. Crucible steel, knurled handles.

Length....inches	4	5	6
Price....per doz.	**7.00**	**7.30**	**7.90**
Length....inches	7	8	.....
Price....per doz.	**10.00**	**11.75**	.....

SIDE CUTTING PLIERS

Fig. 18222C

No. 240 Lap joint Crucible steel, blued handles.

Length....in.	4	5	6	7	8
Price.per doz.	**4.90**	**5.60**	**6.90**	**8.50**	**10.50**

SIDE CUTTING PLIERS

Fig. 18222D

No. 500. Lap joint. Beveled head, black handles.

Length..inches	6	7	8	9
Price..per doz.	**11.00**	**13.50**	**15.75**	**23.00**

SLIP JOINT PLIERS

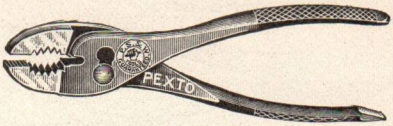


Fig. 18222E

No. 5. Has wire cutter and knurled handles.

Length....inches	6	8	10
Price, Pol. Head. per doz.	**5.00**	**6.10**	**7.25**
" N. P. "	**6.10**	**7.25**	**8.50**

LONG REACH, FLAT NOSE PLIERS

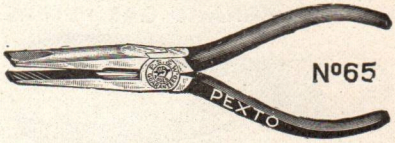


Fig. 18222F

No. 65. Lap joint. Forged steel, side cutting.

Length .....inches	5½
Price.....per doz.	**10.00**

MILLINERS' PLIERS

Fig. 18222G

No. 49. Lap joint, forged steel.

Length..... inches	4	4½	5
Price.....per doz.	**6.75**	**7.00**	**7.25**

DIAGONAL CUTTING PLIERS

Fig. 18222H

No. 27. Box joint, crucible steel, Swedish pattern.

Length.....inches	4½	5	6
Price.....per doz.	**9.75**	**10.25**	**12.50**

PEXTO PLIERS, NIPPERS AND CUTTERS

FLAT NOSE PLIERS

Fig. 27688A

No. 200. Lap joint, flat nose, forged steel.

Length .inches	3	3½	4	4½	5
Price. .per doz.	**2.90**	**2.90**	**3.05**	**3.15**	**3.30**
Length .inches	5½	6	7	8	...
Price. .per doz.	**3.50**	**3.65**	**5.00**	**7.50**	...

BURNER PLIERS

Fig. 27688B

No. 203. Burner pliers, forged steel.

Length.....inches	5	6	7
Price.....per doz.	**2.80**	**3.25**	**3.85**

Fig. 27688C

No. 4. Burner pliers, forged steel.

Length.....inches	5	6
Price.....per doz.	**4.10**	**4.70**

GAS PLIERS

Fig. 27688D

No. 14. Gas pliers, forged steel.

Length .....inches	7	8	10
Price .....per doz.	**5.40**	**5.85**	**7.15**

ROUND NOSE PLIERS

Fig. 27688E

No. 250. Lap joint, round nose, forged steel.

Length .inches	3	3½	4	4½	5
Price. .per doz.	**2.90**	**2.90**	**3.05**	**3.15**	**3.30**
Length .inches	5½	6	7	8	...
Price. .per doz.	**3.50**	**3.65**	**5.00**	**7.50**	...

END CUTTING NIPPERS

Fig. 27688F

No. 74. Lap joint, crucible steel.

Length .....inches	5	6	7
Width of Jaw... "	1	1¼	1½
Price .....per doz.	**6.00**	**8.40**	**9.75**

Fig. 27688G

No. 72. Machinists, lap joint, crucible steel.

Length....in.	4	4½	5	5½	6	8
Width of Jaw "	¾	¾	15/16	1	1 1/16	1⅜
Price. .per doz.	**6.75**	**7.50**	**8.25**	**9.25**	**10.50**	**16.00**

No. 53 SPLICING CLAMPS

Fig. 27688H

Length 11 inches. Has three oval holes for Nos. 4, 6 and 8 iron wire, forged steel, polished head.

Price..... doz. **15.00**

STANLEY SCREWDRIVERS

HURWOOD REGULAR

No. 20—4-INCH

Fig. 15105A

No. 20—8-INCH

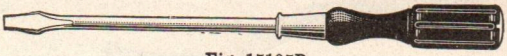


Fig. 15105B

No. 20—10-INCH

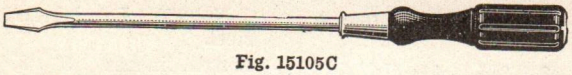


Fig. 15105C

No. 20—SECTIONAL

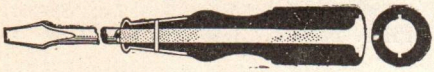


Fig. 15105D

No. 25—SECTIONAL

Fig. 15105E

In the No. 20 the blade runs clear through the handle. In the No. 25 the end is insulated.

The handles are fluted and stained black. Both take same list.

Length of Blade.....inches	2½	3	4	5	6	8
" Over All..... "	6½	7	8	10	11½	14½
Price.....per dozen	**3.30**	**3.80**	**4.50**	**5.40**	**6.45**	**7.95**
Length of Blade.....inches	10	12	18	24	30	....
" Over All..... "	16½	18½	27	33½	39½	....
Price.....per dozen	**9.95**	**11.80**	**18.00**	**24.50**	**30.25**	....

'HURWOOD SPECIAL MACHINISTS'

No. 51

Fig. 15105F

No. 52

Fig. 15105G

No. 53

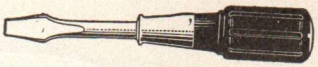


Fig. 15105H

No. 54

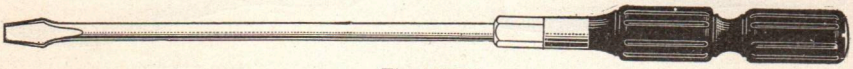


Fig. 15105J

Especially adapted for heavy work where a long driver cannot be conveniently used.

Nos. 51½, 52½, 53½ and 54 are made with a hexagon shank for use with a wrench.

Number.....	51	52	53	51½	52½	53½	54
Length of Blade.....inches	1¾	3	4	1½	2⅝	3¼	7¾
" Over All..... "	5¼	7¼	9½	5½	7½	9 3/16	18
Price.....per dozen	**4.95**	**9.00**	**11.80**	**7.80**	**11.80**	**14.70**	**29.55**

HURWOOD CABINET MAKERS

No. 40

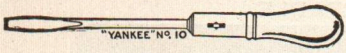
Fig. 15105K

Tips same width as diameter of shank.

Length of Blade.....inches	2½	3	4	5	6	8	10	12
" Over All..... "	6½	7½	9	10½	11½	13½	15½	17½
Price.....per dozen	**3.30**	**3.80**	**4.55**	**5.40**	**6.45**	**7.95**	**9.95**	**11.80**

YANKEE TOOLS

No. 10 RATCHET SCREWDRIVERS



The shifter moves parallel to the blade in this style.

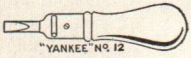
Length...in.	2	3	4	5
Price.per doz.	**9.50**	**11.80**	**12.50**	**13.80**
Length...in.	6	8	10	12
Price.per doz.	**15.50**	**17.50**	**21.00**	**23.20**

No. 11 RATCHET SCREWDRIVERS

No. 11 has shifter moving crosswise.

Length...in.	2	3	4	5
Price.per doz.	**9.50**	**11.80**	**12.50**	**13.80**
Length...in.	6	8	10	12
Price.per doz.	**15.50**	**17.50**	**21.00**	**23.20**

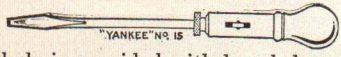
No. 12 RATCHET SCREWDRIVERS



Same as 6-inch No. 11, but with blade only 1⅛ inches long.

Price.....per dozen **13.70**

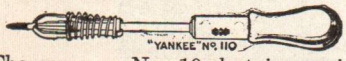
No. 15 RATCHET SCREWDRIVERS



Blade is provided with knurled washer to turn it with thumb and fingers.

Length....inches	2	3	4
Price...per dozen	**10.50**	**11.00**	**11.50**
Length....inches	5	6	8
Price...per dozen	**12.00**	**12.50**	**13.50**

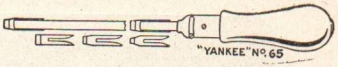
No. 110 RATCHET SCREWDRIVERS



The same as No. 10, but is provided with screw holder attachment.

Length....inches	3	4	5
Price...per dozen	**16.50**	**17.50**	**18.50**
Length....inches	6	8	...
Price...per dozen	**20.50**	**22.50**	.....

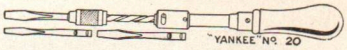
No. 65 RATCHET SCREWDRIVERS



Has four sizes of blades to fit in shank, kept in handle.

Length.....inches	1	6
Price.....per dozen	**23.00**	**26.00**

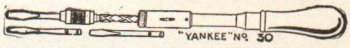
No. 20 SPIRAL SCREWDRIVERS



Right-hand only or rigid for driving screws only.

Length....inches	10	12	13
Price...per dozen	**28.00**	**32.50**	**37.50**

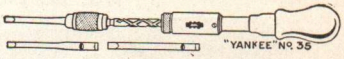
No. 30 SPIRAL SCREWDRIVERS



The standard spiral ratchet screwdriver. Right and left-hand or rigid, 13½ inches long, including bit, when closed. Has 5½-inch stroke.

Price.....per dozen **43.80**

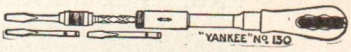
No. 35 SPIRAL SCREWDRIVERS



Similar to No. 30 but lighter for small screws and to carry in pocket. Measures 7 inches long, without bit. Weighs less than 7 ounces.

Price.....per dozen **32.50**

No. 130 SPIRAL SCREWDRIVERS



The spring in handle causes handle to automatically come back for next push and holds blade in slot of screw. The driver can be worked with one hand in inaccessible places. Similar to No. 30, but with spring in handle.

Price.....per dozen **50.00**

STANLEY PLUMBS AND LEVELS

WOOD

No. 0 NON-ADJUSTABLE

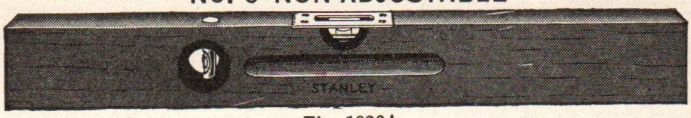


Fig. 1826A

Hardwood. Square top plate. Two side views. Polished.

Price, No. 00, Assorted 18 to 22 inches Long	each	.70
" " 0, " 24 " 30 " "	"	.80

No. 3 ADJUSTABLE

Fig. 1826B

Hardwood. Square top plate. Two side views. Polished and brass tipped.

Price, Assorted 24 to 30 inches Long	each	1.25

No. 30 DUPLEX ADJUSTABLE

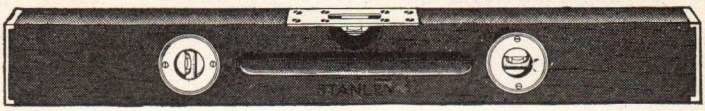


Fig. 1826C

Hardwood. Square top plate. Two duplex side views. Polished and brass tipped.

Price, Assorted 24 to 30 inches Long	each	1.50

No. 25 DUPLEX ADJUSTABLE

Fig. 1826D

Mahogany. Square top plate. Two duplex side views. Polished. Brass tipped and with brass lips.

Price, Assorted 24 to 30 inches Long	each	2.00

No. 35 COMBINED PLUMB RULE AND LEVEL

Fig. 1826E

Soft wood. Has one non-adjustable plumb and one opening for use of plumb bob and line. On account of the length and the larger size of stock they are made of soft wood to obtain lightness of weight.

Price, 42 inches Long	each	1.75

SQUARES AND BEVELS

No. 20 TRY SQUARE

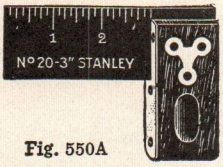


Fig. 550A

No. 12 TRY SQUARE

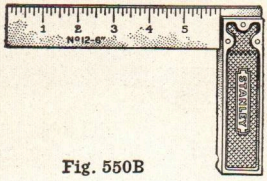


Fig. 550B

No. 1 TRY AND MITRE SQUARE

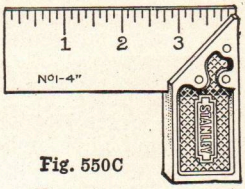


Fig. 550C

No. 18
METAL HANDLE, NICKEL-PLATED BEVEL

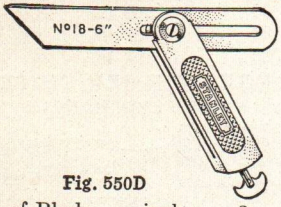


Fig. 550D

No. 25
ROSEWOOD HANDLE BEVEL

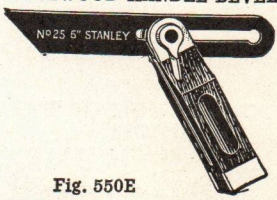


Fig. 550E

Length of Blade.....inches	3	4	4½	6	7½	8	9	10	12
Price, No. 20 Try, Rosewood Handle..per dozen	2.35	....	2.70	3.60	4.15	4.25	5.10	5.50	6.70
Price, No. 2 Try and Mitre, Rosewood Handle.....per dozen	....	....	5.40	6.00	7.20	....	8.40	....	10.80
Price, No. 12 Try, Iron Handle.....per dozen	....	3.40	....	3.95	...	5.00	....	6.40	7.50
Price, No. 1 Try and Mitre, Iron Handle.per doz.	....	5.00	....	6.35	....	7.50	....	....	.....
Price, No. 25 Sliding T Bevel Rosewood Handle.....per dozen	....	....	....	3.95	....	4.30	....	4.65	5.00
Price, No. 18 Eureka Flush T Bevel.....per dozen	....	....	....	6.60	....	8.40	....	9.10	.....

STEEL SQUARES

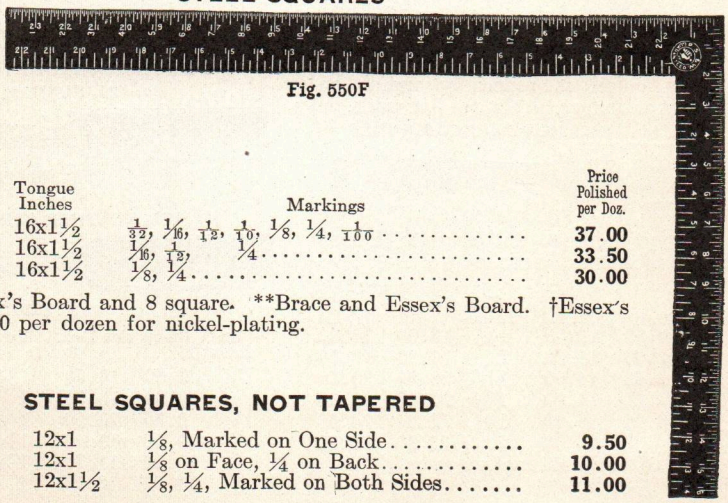


Fig. 550F

No.	Body Inches	Tongue Inches	Markings	Price Polished per Doz.
*100	24x2	16x1½	$\frac{1}{32}$, $\frac{1}{16}$, $\frac{1}{12}$, $\frac{1}{10}$, ⅛, ¼, $\frac{1}{100}$	37.00
** 3	24x2	16x1½	$\frac{1}{16}$, $\frac{1}{12}$, ¼.....	33.50
† 14	24x2	16x1½	⅛, ¼.....	30.00

*Brace, Essex's Board and 8 square. **Brace and Essex's Board. †Essex's Board. Add 7.00 per dozen for nickel-plating.

STEEL SQUARES, NOT TAPERED

21	24x1½	12x1	⅛, Marked on One Side.....	9.50
22	24x1½	12x1	⅛ on Face, ¼ on Back.....	10.00
24	24x2	12x1½	⅛, ¼, Marked on Both Sides.....	11.00

PEXTO CHISELS AND GOUGES

1919 REVISION

SOCKET FIRMER CHISELS

No. 1, PLAIN HANDLE

Fig. 28577A

Made from highest grade crucible steel and Norway iron, 6 to 7-inch blades.

No. 11, LEATHER CAPPED HANDLE

Fig. 28577B

Ground wide at cutting edge, tapers back to socket, allowing easy clearance.

SOCKET FIRMER BUTT CHISELS

No. 61, PLAIN HANDLE

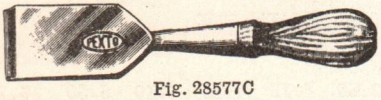


Fig. 28577C

Especially adapted for use in fitting butts or hinges to doors, etc.

No. 71, LEATHER CAPPED HANDLE

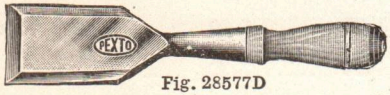


Fig. 28577D

The same as No. 61, but provided with leather capped handle.

SOCKET CABINET CHISELS

No. 101, PLAIN HANDLE

Fig. 28577E

This chisel is especially useful on cabinet or, in fact, all close or fine work.

No. 111, LEATHER CAPPED HANDLE

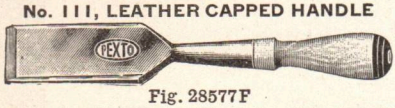


Fig. 28577F

Nicely finished. Fitted with handle that conforms to the make-up of tool.

Size Inches	Price, per Doz. Nos. 1 61, 101	Nos. 11 71, 111	Size Inches	Price, per Doz. Nos. 1 61, 101	Nos. 11 71, 111
1/8	12.50	14.00	7/8	16.00	18.00
1/4	12.50	14.00	1	16.50	18.50
3/8	12.50	14.00	1 1/4	18.50	20.50
1/2	12.50	14.00	1 1/2	20.00	22.00
5/8	14.00	15.50	1 3/4	22.00	24.00
3/4	14.50	16.00	2	23.00	25.00

Nos. 101 and 111, not made in 1/8, 3/8, 5/8 and 7/8-inch sizes.

SOCKET FRAMING CHISELS

Fig. 28577G

The blade is laid with the highest grade of crucible steel.

Size Inches	Price per Dozen	Size Inches	Price per Dozen	Size Inches	Price per Dozen
1/4	9.00	3/4	10.00	1 1/2	13.00
3/8	9.00	1	11.00	1 3/4	14.50
1/2	9.00	1 1/4	12.00	2	16.00

TANGED FIRMER CHISELS

No. 13, PLAIN HANDLE

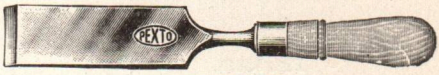


Fig. 28577H

Fitted with selected seasoned white hickory handle with heavy brass ferrule.

No. 23, LEATHER CAPPED HANDLE

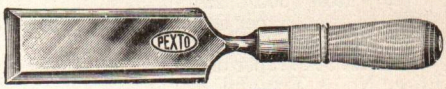


Fig. 28577J

Size Inches	Price, per Doz. No. 13	No. 23	Size Inches	Price, per Doz. No. 13	No. 23
1/8	5.65	6.40	7/8	6.85	7.60
1/4	5.65	6.40	1	7.45	8.20
3/8	5.65	6.40	1 1/4	8.75	9.50
1/2	5.65	6.40	1 1/2	10.25	11.00
5/8	5.95	6.70	1 3/4	12.00	12.75
3/4	6.35	7.10	2	14.25	15.00

SOCKET FIRMER GOUGES

No. 121, PLAIN HANDLE

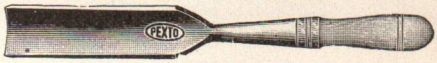


Fig. 28577K

No. 131, LEATHER CAPPED HANDLE

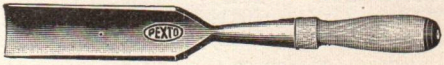


Fig. 28577L

Size Inches	Price, per Doz. No. 121	No. 131	Size Inches	Price, per Doz. No. 121	No. 131
1/8	9.50	10.50	7/8	12.00	13.25
1/4	9.50	10.50	1	12.75	14.00
3/8	9.50	10.50	1 1/4	14.25	15.50
1/2	10.00	11.00	1 1/2	16.00	17.25
5/8	10.50	11.50	1 3/4	17.50	18.75
3/4	11.25	12.25	2	20.00	21.25

CHISELS AND PUNCHES

FULL POLISHED, BLUED FINISH

COLD CHISELS

Number....	1	3	4	5	6
Size...inches	¼	⅜	½	⅝	¾
Length "	4½	5½	6	6½	7
Price, per doz.	**1.80**	**3.60**	**4.20**	**5.40**	**7.80**

DIAMOND POINT CHISELS

Number....	30	32	33	34	35
Size.inches	¼	⅜	½	⅝	¾
Length "	4½	5½	6	6½	7
Price, per doz.	**2.16**	**3.96**	**4.80**	**6.00**	**8.40**

ROUND NOSE CHISELS

Number....	125	127	128	129	130
Size...inches	¼	⅜	½	⅝	¾
Length "	4½	5½	6	6½	7
Price, per doz.	**2.16**	**3.96**	**4.80**	**6.00**	**8.40**

CAPE CHISELS

Number....	61	63	64	65	66
Size...inches	¼	⅜	½	⅝	¾
Length "	4½	5½	6	6½	7
Price, per doz.	**2.16**	**3.96**	**4.80**	**6.00**	**8.40**

ROUND NOSE CAPE CHISELS

Number....	91	93	94	95	96
Size...inches	¼	⅜	½	⅝	¾
Length "	4½	5½	6	6½	7
Price, per doz.	**2.16**	**3.96**	**4.80**	**6.00**	**8.40**

OIL GROOVE CHISELS

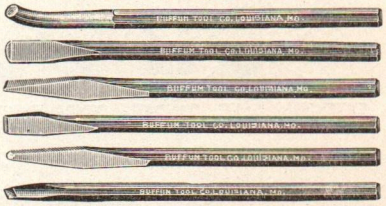
Number.....	121	122	123
Size.....inches	½	⅝	¾
Length..... "	6	6½	7
Price.....per dozen	**4.80**	**6.00**	**8.40**

All chisels and punches made from best grade tool steel, full polished, blued finish.

KEY SEATING CHISELS

Number.....	142	143	144	145
Size.....inches	⅜	½	⅝	¾
Length..... "	5½	6	6½	7
Price.....per doz.	**4.20**	**5.40**	**7.20**	**9.00**

No. 1843 CHISEL SETS



Consists of cold, diamond point, oil groove, half-round, cape and round nose chisels.

Price.....per set **1.50**

No. 513 OCTAGON HAND PUNCHES

POLISHED ENDS

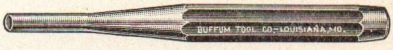
Price, ½-inch, Length, 6 Inches, Diam. Point, 3/16-inch....per doz. **2.40**

No. 726 KNURLED SICKLE SECTION PIN PUNCHES

Price, ⅜-inch, Length, 4 Inches, Diam. Point, ⅛-inch....per doz. **3.00**

No. 701 OCTAGON SICKLE SECTION PIN PUNCHES

POLISHED ENDS



Price, ½-inch, Length, 6 Inches, Diam. Point, ⅛-inch....per doz. **3.00**

No. 754 OCTAGON CENTER PUNCHES

POLISHED ENDS

Price, ½-inch, Length, 5 Inches, Diam. Point, 3/16-inch....per doz. **3.60**

No. 796 KNURLED BRICK PUNCHES

BLUED FINISH

Price, ⅜-inch, Length, 4½ Inches, Diam. Point, ⅜-inch....per doz. **3.00**

EXPLANATION OF BIT AND AUGER TERMS

SINGLE TWIST AUGER BIT

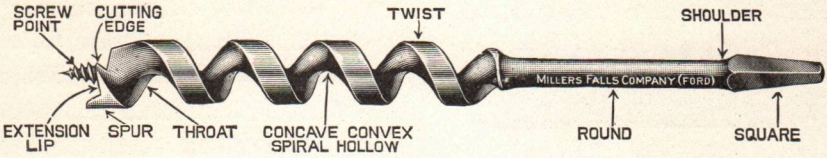


Fig. 24637A

SHIP AUGER WITH SCREW

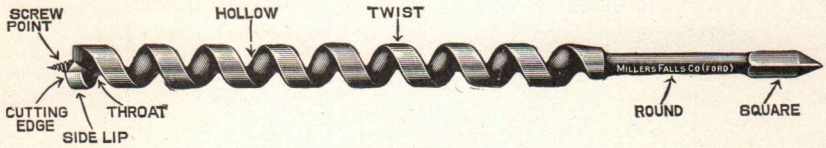


Fig. 24637B

SINGLE TWIST MACHINE BIT

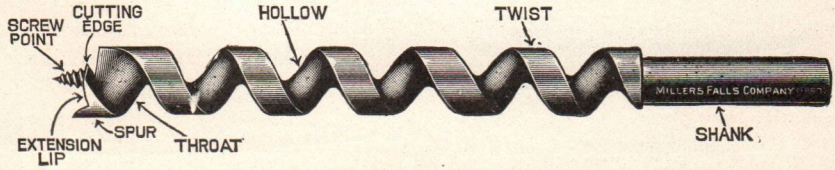


Fig. 24637C

AUGER BITS

STANDARD

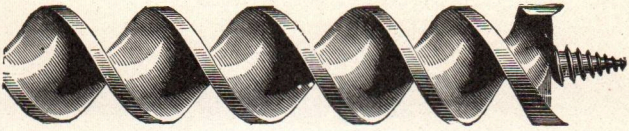


Fig. 1669A

Size in 16ths.....	3	4	5	6	7	8	9	10	11	12
Price.....per dozen	**6.00**	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**	**6.00**	**6.00**	**7.00**	**7.00**
Size in 16ths.....	13	14	15	16	17	18	20	22	24	....
Price.....per dozen	**8.25**	**8.25**	**9.50**	**9.50**	**12.00**	**12.00**	**14.00**	**16.00**	**18.00**	.....

JENNINGS

EXTENSION LIP, SOLID CAST STEEL

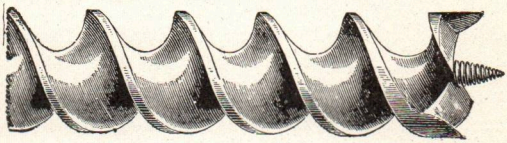


Fig. 1669B

Size in 16ths.....	3	4	5	6	7	8	9	10	11	12
Price.....per dozen	**6.00**	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**	**6.00**	**6.00**	**7.00**	**7.00**
Size in 16ths.....	13	14	15	16	17	18	20	22	24	....
Price.....per dozen	**8.25**	**8.25**	**9.50**	**9.50**	**12.00**	**12.00**	**14.00**	**16.00**	**18.00**	.....

IRWIN'S SOLID CENTER

EXTENSION LIP, DOUBLE CUTTER

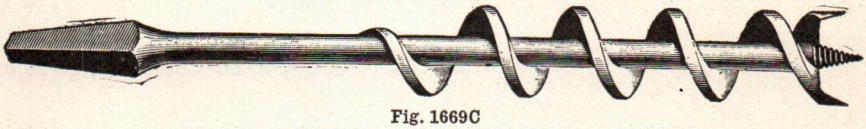


Fig. 1669C

Size in 16ths.....	3	4	4½	5	5½	6	6½	7
Price.....per dozen	**4.50**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.50**	**4.50**
Size in 16ths.....	7½	8	8½	9	10	11	12	13
Price.....per dozen	**5.00**	**5.00**	**5.50**	**5.50**	**6.00**	**7.00**	**7.00**	**8.00**
Size in 16ths.....	14	15	16	17	18	19	20	21
Price.....per dozen	**8.00**	**9.00**	**9.00**	**10.50**	**10.50**	**12.00**	**12.00**	**13.50**
Size in 16ths.....	22	23	24	26	28	30	32	.....
Price.....per dozen	**13.50**	**15.00**	**15.00**	**17.00**	**19.00**	**21.00**	**23.00**	.....

SHIP AUGERS, ETC.

IMPROVED SHIP AUGERS

WITH SCREW

Fig. 2960A

WITHOUT SCREW

Fig. 2960B

Adopted February 1, 1916

WITH OR WITHOUT SCREW—12-INCH TWIST

Sizes in 16ths.....	4 to 10	11 and 12	13 and 14	15 and 16	17 and 18	19 and 20
Price, with Screw...per dozen	**11.00**	**12.00**	**13.00**	**14.50**	**16.00**	**18.00**
" without " ... "	**13.20**	**14.40**	**15.60**	**17.40**	**19.20**	**21.60**
Sizes in 16ths.....	21 and 22	23 and 24	25 and 26	27 and 28	29 and 30	31 and 32
Price, with Screw...per dozen	**20.00**	**23.00**	**27.00**	**32.00**	**38.00**	**45.00**
" without " ... "	**24.00**	**27.60**	**32.40**	**38.40**	**45.60**	**54.00**

SOLID CAST STEEL CAR BITS—12-INCH TWIST

Fig. 2960C

Sizes in 16ths.....	4	5	6	7	8	9	10	11	12
Price.....per dozen	**11.25**	**11.25**	**11.25**	**11.25**	**11.25**	**12.50**	**13.75**	**15.00**	**16.25**
Sizes in 16ths.....	13	14	15	16	17	18	20	22	24
Price.....per dozen	**17.50**	**19.00**	**20.50**	**22.00**	**24.00**	**26.00**	**30.00**	**34.00**	**38.00**

POWER MACHINE BITS—DOUBLE TWIST

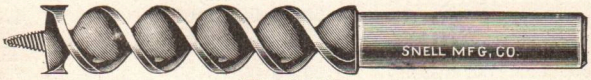


Fig. 2960D

When ordering machine bits state length and diameter of both twist and shank. Can also furnish single twist, ship auger, etc., styles. The different requirements of our customers invariably necessitate our getting these from the factory.

EXPANSIVE BITS, ETC.

CLARK'S EXPANSIVE BITS

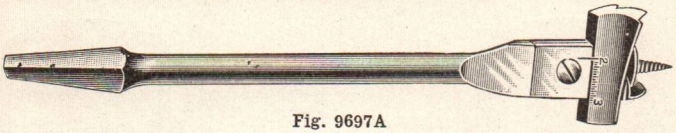


Fig. 9697A

Cuts	inches	½ to 1½	⅞ to 3
Price	per dozen	18.00	26.00
" Caps only	each	.12	.15
" Screws only	per dozen	.60	.70

EXTRA CUTTERS FOR EXPANSIVE BITS

Number	1	2	3	4
Bores inches	½ to ⅞	⅞ to 1½	⅞ to 1¾	1¾ to 3
Price per dozen	3.00	3.75	5.25	6.00
Number	5	6	7	.....
Bores	3 to 4	4 to 5	5 to 6	.....
Price per dozen	9.00	12.00	15.00	.....

LIBERTY PATTERN GIMLET BITS

Fig. 9697B

Size in 32nds	1	2	3	4	5	6
Price per dozen	....	1.00	1.10	1.10	1.10	1.10
Size in 32nds	7	8	9	10	11	12
Price per dozen	1.10	1.10	1.25	1.25	1.50	1.50

ELECTRICIANS' AND BELL HANGERS' GIMLETS

Wood Handles

Fig. 9697C

Length inches	15	18	24	30	36
Price per dozen	6.00	7.00	9.00	12.00	15.00

State diameter and length when ordering.
Sizes 6 to 12 32nds, same price.

ANGULAR BORING MACHINES

Price ..... each **6.75**

BORING MACHINE AUGERS

Size.... inches	¼	⅜	7/16	½	⅝
Price, per doz.	10.00	10.00	10.00	10.00	10.00
Size.... inches	¾	⅞	1	1⅛	1¼
Price, per doz.	11.00	13.00	15.00	17.00	19.00
Size.... inches	1⅜	1½	1¾	2	....
Price, per doz.	21.00	24.00	28.00	32.00	....

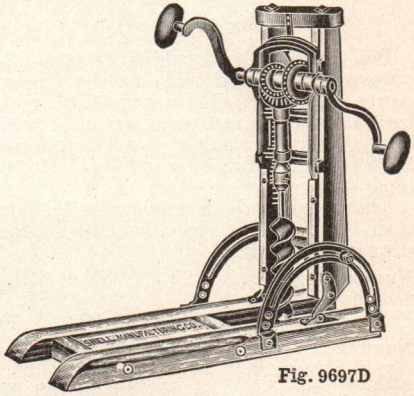


Fig. 9697D

RATCHET BRACES

Nos. 769 TO 774

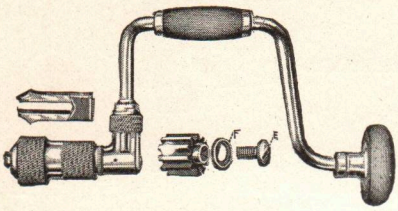


Fig. 24632A

Ball bearing, steel clad head, and ball-bearing chuck with powerful grip. M. F. Lion chuck has forged steel jaws holding positively and centering with reasonable accuracy. Round shanks from ⅛ to ½ inch. No. 1 taper, bit stock and expansion bit shanks. Boxed ratchet, cocobolo wood and highly nickeled metal parts.

Number.....	769	770	771
Size of Sweep..in.	16	14	12
Price....per doz.	**56.00**	**52.00**	**50.00**
Number.....	772	773	774
Size of Sweep..in.	10	8	6
Price....per doz.	**48.00**	**46.50**	**46.50**

Nos. 729 TO 734

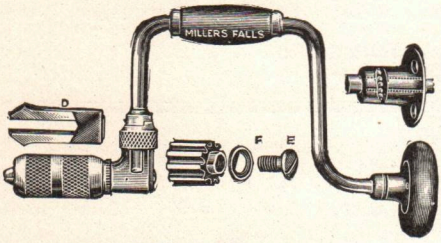


Fig. 24632B

Ball bearing head which greatly decreases friction and adds to the boring power. The Holdall chuck on this brace has patent mill forged steel jaws that hold bit stock shanks, straight shank drills from ⅛ to ½ inch in diameter and No. 1 Morse taper shanks.

The chuck body is made of solid bar steel. The shell is specially designed for strength.

Number.....	729	730	731
Size of Sweep..in.	16	14	12
Price....per doz.	**49.00**	**45.00**	**43.00**
Number.....	732	733	734
Size of Sweep..in.	10	8	6
Price....per doz.	**41.00**	**39.50**	**39.50**

Nos. 30 TO 34

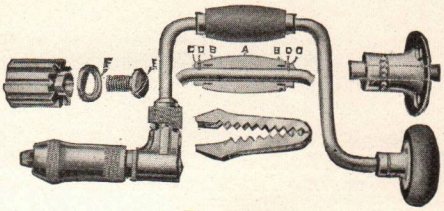


Fig. 24632C

Barber chucks, with alligator jaws; fills all requirements when using bit stock shanks only in the brace. Are not recommended for straight shanks except in small sizes, and can be used with them successfully, only where the work does not offer much resistance. Jaws are of forged steel; ratchet of the boxed pattern with dogs exposed, and the head ball bearing.

Number.....	30	31	32
Size of Sweep..in.	14	12	10
Price...per dozen	**41.00**	**39.00**	**37.00**
Number.....	33	34	.....
Size of Sweep..in.	8	6	.....
Price...per dozen	**35.50**	**35.50**	.....

Nos. 320 TO 323

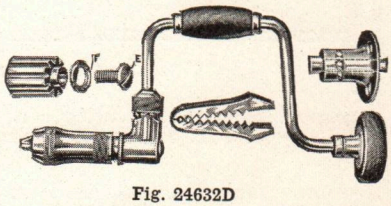


Fig. 24632D

A medium priced ball bearing ratchet brace. The barber chuck has forged steel alligator jaws and is a fine quality barber chuck. Open ratchet construction; metal rings inserted in sweep handle; head and handles stained hardwood, exposed metal parts polished and nickeled. Packed ½ dozen in a pasteboard box, and 3 dozen in a case.

Number.....	320	321
Size of Sweep.....in.	14	12
Price.....per dozen	**31.00**	**29.50**
Number.....	322	323
Size of Sweep.....in.	10	8
Price.....per dozen	**28.00**	**27.00**

BRACES, BIT STOCKS AND BIT HOLDERS

DRILL BRACES

No. 182

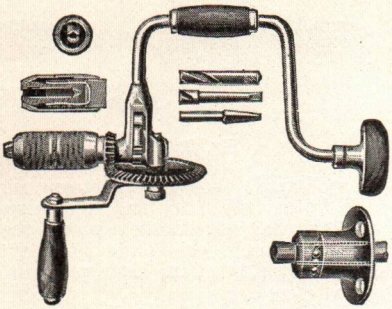


Fig. 24628A

A high grade ball-bearing ratchet brace. Has 10-inch sweep. The drilling attachment can be removed or affixed in a moment's time. Gear ratio is about 3 to 1.

Packed in individual boxes. Weight, boxed about 5 pounds.

Price, No. 182.....per dozen **60.00**

UNIVERSAL ANGULAR BIT STOCKS

Fig. 24628B

For use in a bit brace or breast drill for drilling at an angle or in awkward places. Equipped with master chuck it will take bit-stock shanks, round shanks from ⅛ to ½ inch and No. 1 Morse taper shanks. Also can be used as a bit extension in straight work. Angle of boring can be adjusted to any point from 180° to 125°. The main casting is japanned; chuck and other parts nickeled. Length when at 180°, 12½ inches.

Price, No. 108.....per dozen **28.00**

CORNER BIT BRACES

Nos. 502 TO 503

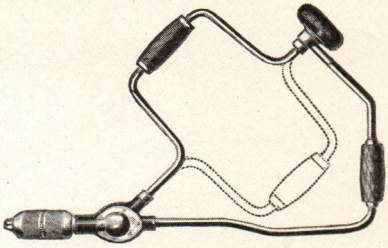


Fig. 24628C

Made of cocobolo wood. Metal parts polished and nickeled except japanned hub casting. Ball-bearing head.

Chuck operated by inclosed gears, (case-hardened) protected from dust and dirt.

No.	Length Inches	Size of Sweep Inches	Price per Doz.
502	17½	10	**61.00**
503	17½	8	**56.00**

EXTENSION BIT HOLDERS

No. 5

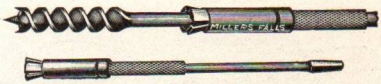


Fig. 24628D

This is a popular style of extension bit holder of the type to follow a bit ⅝ inch or larger into its bore. The bit is held in place by four strong steel jaws joined at their base and re-enforced by the chuck shell against which they rest. While this tool is strong it should be remembered that none of this class should be subjected to side strain or used with a bit larger than 11/16 inch in diameter.

Bits are inserted and released easily and quickly. Polished finish.

Length....inches	12	15	18
Price...per dozen	**16.30**	**16.60**	**16.90**
Length....inches	21	24	30
Price...per dozen	**17.50**	**18.00**	**19.00**

HAND DRILLS AND DRILL POINTS

No. 5

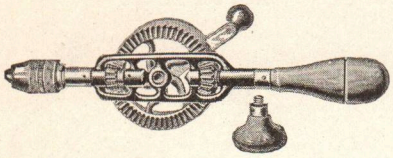


Fig. 24631A

Has all cut gears and steel pinions, including an idler pinion to equalize the bearings and lend smoothness to the action. The large gear has a wide rim to be grasped between the thumb and finger tips in doing delicate work.

Has ball thrust bearing, which means longer life in the bearings and greater ease in operation. The end handle is hollow with a screw cap and contains eight wood boring points. The side grip handle is detachable.

Equipped with springless three-jaw chuck with capacity up to 3/16-inch.

Length.....inches 12½
Price.....per dozen **31.50**

No. 104

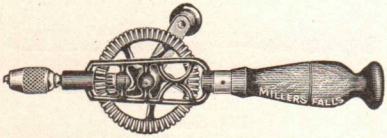


Fig. 24631B

A well constructed small hand drill equipped with a set of points.

Has hollow end handle of Gripfast design, with screw cap which contains eight wood boring points.

Cut gears and steel pinion. Has an adjustable equalizing bearing to offset the outward thrust of the large gear. Drill is equipped with a star chuck to take drills up to 3/16-inch. The chuck has self-opening jaws actuated by springs hidden in the base.

Stained hardwood handles, black enameled frame, and nickeled chuck.

Length.....inches 11½
Price.....per dozen **25.00**

No. 1

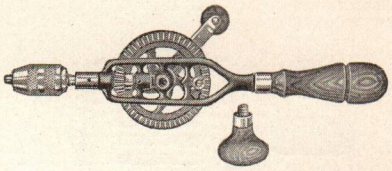


Fig. 24631C

A well-made tool with a strong malleable frame, cut gears, and steel pinion. Though it has not double pinions, there is an adjustable equalizing bearing to prevent any play of the large gear.

Has ball thrust bearing, insuring long life and ease of operation.

The end handle is hollow and contains eight wood points; it has a detachable side grip handle.

Equipped with springless three-jaw chuck to take round shanks up to 3/16-inch.

Length.....inches 12½
Price.....per dozen **29.00**

HAND DRILL POINTS

Fig. 24631D

For use in wood and soft metals only.

Price.....per set **.35**
" .....per dozen **.50**

Packed 1 set or 1 dozen in a box.

HAND DRILLS

No. 980

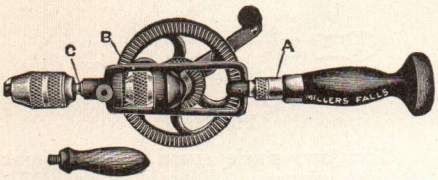


Fig. 24630A

Has an idler pinion to counteract the outward thrust of the large gear. For rapid drilling a ratchet should not be used. The continuous cutting of the drill into the work is essential for quick results. An important feature is the ball thrust bearing, which insures long wear and ease in operation.

Equipped with star three-jaw chuck to hold drills up to ⅜-inch. The springs in the chuck are situated down in the base where they cannot be reached by the shank of the drill and jammed or knocked out of place.

Has stained hardwood handles; side handle is removable; malleable iron frame, other parts nickeled.

Length.....inches 15¼
Price.....per dozen **53.00**

No. 2

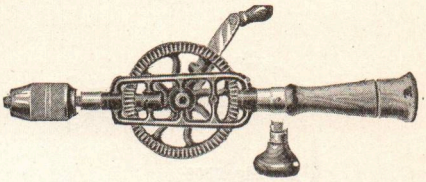


Fig. 24630C

Gear ratio of 4½ to 1. Hollow handle opens with screw cap and contains eight wood boring points that are furnished with the tool.

The side grip handle is removable. Main handle flat on end and usable as body rest.

Has three-jaw star chuck with protected springs which takes round drills up to ⅜ inch. Ball thrust bearing. Steel pinion. Cut gears with adjustable friction roll to equalize bearings. Cocobolo handle.

Nickeled chuck and crank.

Length.....inches 14½
Price.....per dozen **42.00**

No. 343

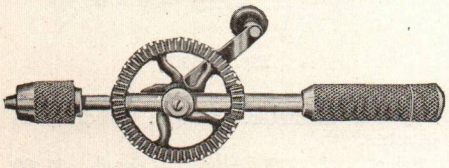


Fig. 24630B

This is among the more popular of the newer styles of hand drills. It combines beauty of appearance with thorough workmanship.

The main handle is of hollow steel practically unbreakable. Has no ratchet and large gear is of open construction. tion.

Solid steel frame with idler gear.

Three-jaw springless chuck 3/16-inch capacity. No drills are furnished.

Length.....inches 11
Price.....per dozen **29.00**

No. 303

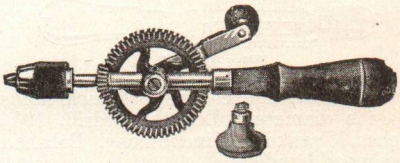


Fig. 24630D

This is one of the newer hand drills that has become a favorite on account of its moderate price.

It has a solid steel frame, a detachable side handle and a hollow end handle with screw cap. The gears are cut and the pinion is of steel.

Equipped with springless three-jaw chuck which takes drills up to 3/16-inch. Large gear red, other parts nickeled. No drill points included.

Length.....inches 11¼
Price.....per dozen **24.00**

YANKEE DRILLS

No. 1545 HAND DRILLS

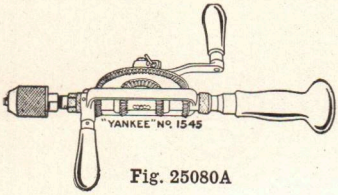


Fig. 25080A

Three-jaw, two speeds. Chuck holds ⅜-inch diameter. Length of drill, 15¾ inches.

Price.....each **12.20**

No. 1540 HAND DRILLS

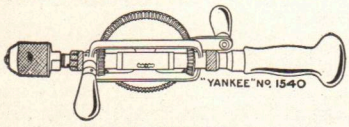


Fig. 25080B

Three-jaw, single speed. Chuck holds ⅜-inch diameter. Length of drill, 15¾ inches. Extreme length, 16 inches.

Price.....each **10.00**

No. 1530 HAND DRILLS

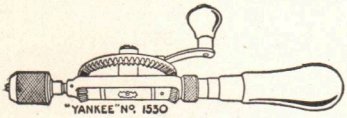


Fig. 25080C

Three-jaw, single speed. Chuck holds 3/16-inch diameter. Length of drill, 10½ inches. Crank is 2¾ inches long. Polished hardwood handle.

Price.....each **6.40**

No. 1430 HAND DRILLS

Fig. 25080D

Three-jaw, single speed. Chuck holds 3/16-inch diameter. 10¾ inches long. Polished hardwood handle, 4 inches long, 1½ inches in diameter.

Price.....each **4.50**

No. 550 BREAST DRILLS

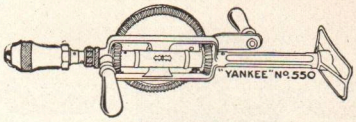


Fig. 25080E

Two-jaw, single speed. Chuck holds ½-inch diameter . Length of drill, 17½ inches; extreme length, 18 inches.

Price.....each **11.80**

No. 555 BREAST DRILLS

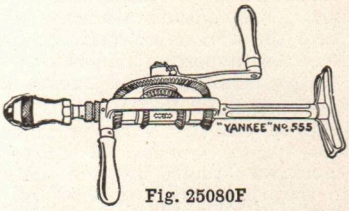


Fig. 25080F

Two-jaw, two speeds. Chucks holds ½-inch diameter. Length of drill, 17½ inches.

Price.....each **14.00**

No. 1550 BREAST DRILLS

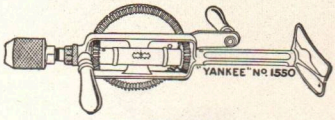


Fig. 25080G

Three-jaw, single speed. Chuck holds ½-inch diameter. Length of drill, 17 inches.

Price.....each **11.80**

No. 1555 BREAST DRILLS

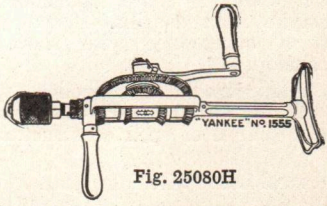


Fig. 25080H

Three-jaw, two speeds. Chuck holds ½-inch diameter. Length of drill, 17 inches.

Price.....each **14.00**

MILLERS FALLS BREAST DRILLS

No. 12 BREAST DRILLS

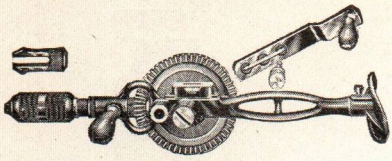


Fig. 30359A

With master chuck holding round shanks from ⅛ to ½-inch, all sizes of bit stock, and No. 1 taper shanks. Ball-bearing. Changeable speed. Level attachment.

Length..... .....inches 17½
Price..... ... .per dozen **53.00**

No. 13 BREAST DRILLS

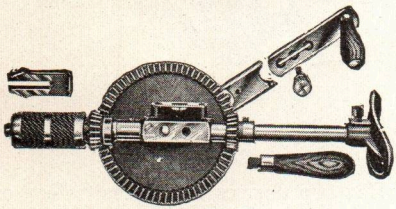


Fig. 30359B

With master chuck holding round shanks from ⅛ to ½-inch, all sizes of bit stock, and No. 1 taper shanks. Ball-bearing. Cut gears. Extensible crank. Level attachment. Double pinions.

Length..... .....inches 15
Price..... ....per dozen **68.00**

No. 200 BREAST DRILLS

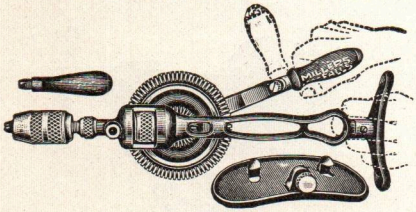


Fig. 30359C

Same as No. 199, except that it has three-jaw star chuck with protected jaw springs. Holds round shanks only up to ½-inch. Length, 18 inches.

Price..... ...per dozen **81.00**

No. 2100 BREAST DRILLS

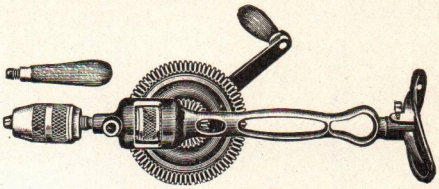


Fig. 30359D

Has an adjustable breastplate, and a removable side grip handle. Star pattern chuck with three jaws. Accommodates round shanks up to ½ inch. Cut gears, steel pinions.

Length,.....inches 17½
Price..... ..per dozen **59.00**

No. 97 RATCHET BREAST DRILLS

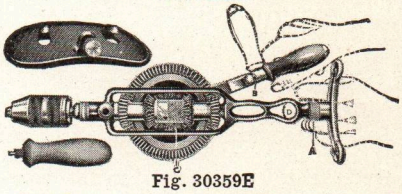


Fig. 30359E

Ratchet to right or left continuously on both forward and backward strokes of the crank. Has star chuck with three jaws for round shanks from 0 to ½ inch in diameter. Two speeds, instantly changeable. Ball-bearing.

Length..... .. ..inches 17½
Price.....per dozen **110.00**

No. 130 BREAST DRILLS

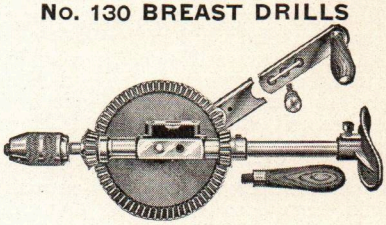


Fig. 30359F

The same as breast drill No. 13, except that chuck is of the star pattern, with three jaws, made especially for holding round shanks only, from 0 to ½ inch in diameter. Jaws are operated by springs that are protected from injury and will not get out of order.

Length..... .....inches 15
Price..... . ... ..per dozen **76.00**

CHAIN DRILLS, DRILL PRESSES AND VISES

CHAIN DRILLS

No. 717

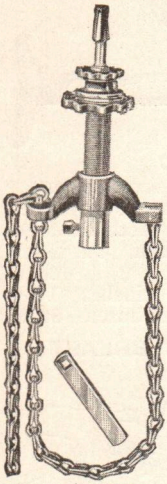


Fig. 24909A

No. 718

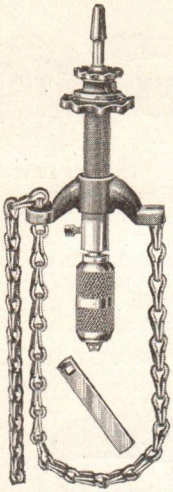


Fig. 24909B

An auxiliary tool for use with a breast drill or bit brace where the power desired to feed the drill is greater than the workman can give. The drill is fed into the work automatically by an adjustable friction feed operating on a similar principle to an automobile friction clutch. The feed speed is automatically regulated by the drill resistance.

No. 717. Has no chuck. Diameter of socket hole, ½ inch. Shanks ½ inch in diameter can be inserted in socket and held fast by a square head screw. 4 feet of chain included.

No. 718. Same as No. 717, except that the master chuck is added for holding round shanks from ⅛ to ½ inch in diameter, bit stock, and No. 1 Morse taper shanks.

No. 719. Same as No. 717, except that star chuck is provided for holding round shanks from 0 to ½ inch in diameter. Jaws are operated by springs that are protected from injury and will not get out of order.

No.	Length Inches	Weight Pounds	Price Each
717	*8½	3½	**2.60**
718	†11½	4½	**4.00**
719	†11¾	4½	**4.90**

*Length of main spindle.
†Length, with chuck inserted.

No. 216 BENCH DRILL PRESSES

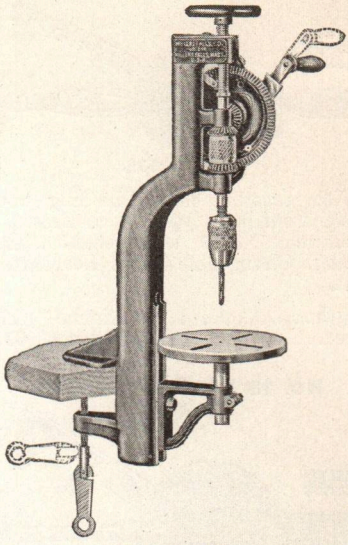


Fig. 24909C

Has two degrees of automatic feed or may be fed by hand.

Speed is instantly changeable, crank is extensible, spindle is ball thrust bearing, gears are cut and pinions of steel.

Chuck is of star pattern, with protected jaw springs, and holding round shanks from 0 to ½ inch in diameter. Height over all, 28 inches.

Price.....each **17.00**

No. 217 VISES

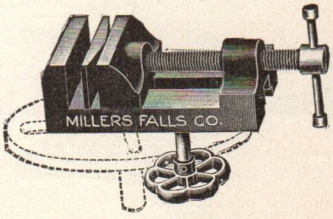


Fig. 24909D

Detachable swivel jaw to hold work of irregular shapes. Opens 2⅜ inches, without swivel jaw, 3 inches.

Price.....each **2.25**

KEYSTONE REVERSIBLE RATCHETS

SQUARE SLEEVE

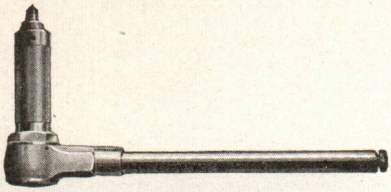


Fig. 7080A

For square shank drills only. No. 1 standard square taper (5/8x3/8x1 1/2 inches long) used on ratchets up to and including 16-inch. No. 2 standard square taper (3/4x1/2x1 3/4 inches) on larger sizes.

Number.....	1	2	3	4
Handle.inches	10	14	16	18
Price....each	**5.00**	**5.75**	**6.50**	**7.25**
Number.....	5	6	7	....
Handle.inches	22	24	28	....
Price....each	**7.50**	**7.75**	**8.25**	....

BOILER MAKER'S SHORT FEED

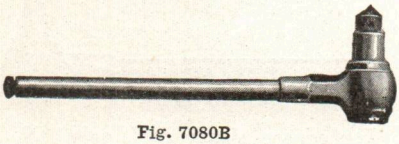


Fig. 7080B

For square shank drills only No. 1 standard square taper (5/8x3/8x1 1/2 inches long) used on ratchets up to and including 16-inch. No. 2 standard square taper (3/4x1/2x1 3/4 inches) on larger sizes.

Number.....	31	32	33	34
Handle.inches	10	14	16	18
Price....each	**5.00**	**5.75**	**6.50**	**7.25**
Number.....	35	36	37	....
Handle.inches	22	24	28	....
Price....each	**7.50**	**7.75**	**8.25**	....

SQUARE SHANK SLEEVES

No. 1 fits No. 21 ratchets; No. 2 fits Nos. 22 and 23; No. 4 fits Nos. 24, 25, 26 and 27 ratchets.

Number.....	1	2	4
Price.....each	**1.00**	**1.25**	**1.50**

Square sleeve and boilermaker's ratchets are adapted for square shanks only.

MORSE TAPER

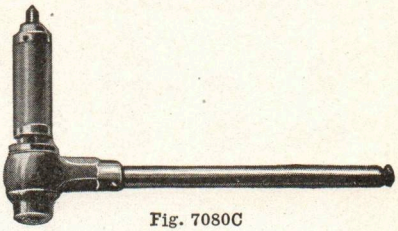


Fig. 7080C

The 10-inch size takes No. 2 Morse taper. The 14 and 16-inch size takes No. 3 Morse taper. The 18 to 28-inch sizes take No. 4 Morse taper.

Number.....	21	22	23	24
Handle.inches	10	14	16	18
Price....each	**5.25**	**6.00**	**6.75**	**7.50**
Number.....	25	26	27	....
Handle.inches	22	24	28	....
Price....each	**7.75**	**8.00**	**8.50**	....

COMBINATION No. 200

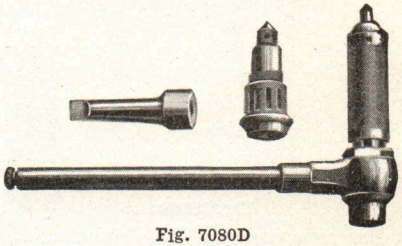


Fig. 7080D

Consists of ratchet for taper shank twist drills; sleeve for square shank drills, and short boiler socket for square shank drills.

Sockets are interchangeable. Prices given are for complete combinations.

The 10-inch size takes No. 2 Morse taper and No. 1 square shank drills. The 14 and 16-inch size take No. 3 Morse taper and No. 1 square shank drills. The 18 to 28 inch sizes take No. 4 Morse taper and No. 2 square shank drills.

Number.....	51	52	53	54
Handle.inches	10	14	16	18
Price....each	**7.75**	**9.00**	**10.00**	**11.25**
Number.....	55	56	57	....
Handle.inches	22	24	28	....
Price....each	**11.50**	**11.75**	**12.25**	....

KEYSTONE AND MONARCH RATCHETS

KEYSTONE REVERSIBLE COMBINATION, No. 300

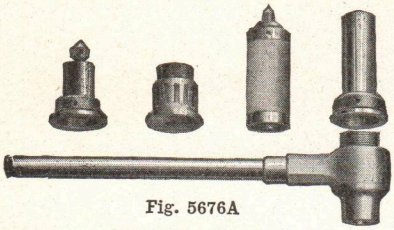


Fig. 5676A

Tool complete includes long and short feed for Morse taper. Also long and short feed for square shank drills. A new high-grade combination tool for light work.

The taper socket is No. 1, taking all sizes of taper shank drills from 1/16 to 19/32 inch: Also bit stock taper drills and reamers. Length of handle, 8½ inches.

Price, Complete.....each **7.00**

MONARCH, SINGLE-ACTING, SQUARE SLEEVE

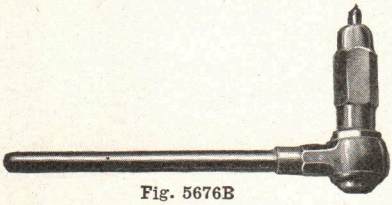


Fig. 5676B

For square shank drills only. No. 1 standard square taper (⅝x⅜x1½ inches long) used on ratchets up to and including 15-inch: No. 2 standard square taper (¾x½x1¾ inches) on larger sizes.

Number.....	10	20	30	40
Handles inches	10	12	15	18
Price....each	**5.00**	**5.50**	**6.00**	**7.50**
Number.....	50	60	70	....
Handles inches	22	24	28	....
Price....each	**8.50**	**9.00**	**10.00**	....

Monarch Ratchets are particularly adapted to the use of bridge builders, shipbuilders, boiler makers, railroad and iron construction work, and all purposes where a strong and substantial single-acting ratchet drill is required. The body is made of drop-forged steel, sockets of forged steel, and handle of solid bar steel.

MONARCH, SINGLE-ACTING, MORSE TAPER

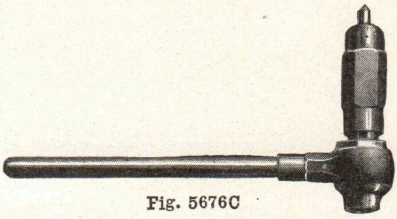


Fig. 5676C

The 10-inch sizes take No. 2 Morse taper. The 12 and 15-inch size takes No. 3 Morse taper. The 18 to 28-inch sizes take No. 4 Morse taper.

Number.....	110	120	130	140
Handle inches	10	12	15	18
Price....each	**5.25**	**5.75**	**6.25**	**7.75**
Number.....	150	160	170	....
Handle inches	22	24	28	....
Price....each	**8.75**	**9.25**	**10.25**	....

MONARCH, SINGLE-ACTING, BOILER MAKERS'

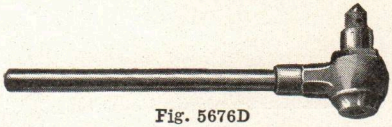


Fig. 5676D

For square shank drills only. No. 1 standard square taper (⅝x⅜x1½ inches long) use on 10 to 15 inch sizes: No. 2 standard square taper (¾x½x1¾ inches) on larger sizes.

Number.....	210	220	230	240
Handle inches	10	12	15	18
Price....each	**4.25**	**4.75**	**5.50**	**7.50**
Number.....	250	260	270	....
Handle inches	22	24	28	....
Price....each	**8.50**	**9.00**	**10.00**	....

KEYSTONE RATCHET SOCKET WRENCHES

No.	Length Handle Inches	For Nuts Bolt Sizes Inches	Price with One Socket	Price Extra Sockets
171	10	¼ to ⅝	**4.75**	**1.75**
172	14	⅜ " ⅞	**5.50**	**2.00**
173	16	½ " 1⅛	**6.50**	**2.50**
174	18	⅝ " 1½	**7.50**	**3.00**
175	22	⅝ " 1½	**7.75**	**3.00**
176	24	⅝ " 1½	**8.00**	**3.00**
177	28	⅝ " 1½	**8.50**	**3.00**

KEYSTONE AND GIANT RATCHETS, ETC.

GIANT RAILROAD TRACK RATCHET
SINGLE-ACTING

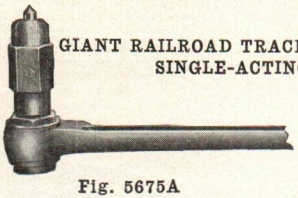


Fig. 5675A

GIANT SOCKET WRENCH
REVERSIBLE

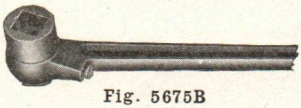


Fig. 5675B

KEYSTONE RATCHET TAP WRENCH
REVERSIBLE

Fig. 5675C

GIANT RAILROAD TRACK RATCHET

This tool is made with web handle, of drop-forged steel; extra heavy pawl of tool steel; socket drifted from solid steel; hexagon feed nut, with all-tool-steel feed screw, acme thread.

Price, with 24-inch Handle only, for No. 2 Square Taper Shank Drills.....each	9.00

GIANT SOCKET WRENCHES

Users of socket wrenches will find this article very much stronger than the ordinary malleable iron wrench on the market.

Price, for 24-inch Handle and One Socket.....each	8.00
" Extra Sockets..... "	3.50

Made with 24-inch handle only and for following size nuts: ¾, ⅞, 1, 1⅛ and 1¼ inch standard bolt sizes.

KEYSTONE RATCHET TAP WRENCHES

This tool will prove a very valuable addition for all first-class machine shops, builders of machinery, boiler shops, for use on stay bolts, flue expanders, etc.

Number.....	61	61A	62	63	64	65	66	67
Length of Handle.....inches	10	14	14	16	18	22	24	28
Square Hole in Socket.... "	⅝	¾	⅞	1	1⅛	1⅛	1⅛	1⅛
Price, with One " .....each	4.25	5.00	5.00	5.75	6.50	6.75	7.00	7.50
" Extra Sockets..... "	1.25	1.50	1.50	1.75	2.00	2.00	2.00	2.00

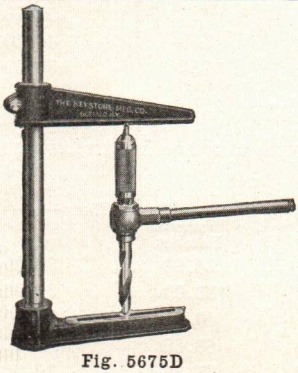


Fig. 5675D

KEYSTONE DRILLING POST OR "OLD MAN"

For Use with Ratchet Drills

By the use of the Keystone Drilling Post many hours of labor can be saved where users of ratchet drills have to devise means or methods of bracing their ratchet for various classes of work. The drilling post is a necessity in almost all classes of drilling, and where time is money.

Number.....	0	1	2
Height of Post.....inches	16	20	26
Radius of Arm..... "	8	10	12
Weight.....pounds	.....	14	27
Price.....each	6.00	8.00	10.00

PUNCHES

STEEL SCREW

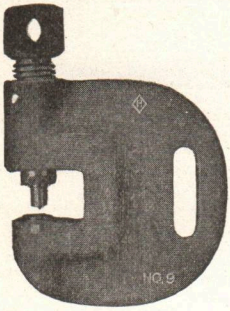


Fig. 23719A

STRUCTURAL STEEL

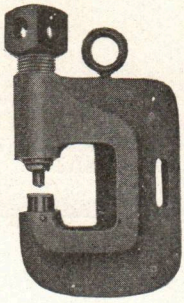


Fig. 23719B

STEEL SCREW, WITH RATCHET

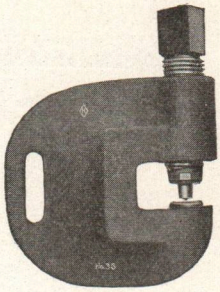


Fig. 23719C

STEEL SCREW

In ordering punches and dies state size of rivets for which they are to be used and we will make allowance for clearance. Factory system of marking punches and dies is that the size stamped on them denotes the size rivet for which they are to be used. A punch and die marked ½ indicates that they are for ½-inch rivet, but they will punch holes about 9/16 inch in diameter.

Number	0	1	2	3	3½	4	5
Punches Holes for Rivets.....inches	½	½	¾	¾	¾	1	1
Thickness of Iron will Punch.. "	¼	⅜	½	¾	¾	1	⅝
From Edge of Sheet ..... "	1½	1½	2	2½	4	4¼	6
Weight.....pounds	15	24	38	62	80	145	200
Price.....each	**24.00**	**30.00**	**40.00**	**60.00**	**75.00**	**90.00**	**125.00**
" Extra Punches and Dies..per set	**3.50**	**4.00**	**4.00**	**5.00**	**5.00**	**7.00**	**7.00**

STRUCTURAL STEEL

Number	Depth of Gap Inches	Height of Gap Inches	Capacity Inches	Weight Pounds	Price Each
10	2¼	3½	¾ in ⅜	55	**25.00**
12	3	4½	¾ " ½	85	**30.00**
14	4	4½	1 " ½	160	**44.00**
16	5½	6½	1 " ½	180	**50.00**

STEEL SCREW, WITH RATCHET

This is the regular standard screw punch, but is fitted with a square head screw for use with the ratchet.

	Size of Rivet				Price, Each	
Number	Hole Inches	Iron Inches	Gap Inches	Weight Pounds	Without Ratchet	Ratchets only
0	½	¼	1½	15	**24.00**	**30.00**
1	½	⅜	1½	24	**30.00**	**30.00**
2	¾	½	2	38	**40.00**	**30.00**
3	¾	¾	2½	62	**60.00**	**35.00**
3½	¾	¾	4	80	**75.00**	**35.00**

WHITNEY PUNCHES

No. 1 PUNCH

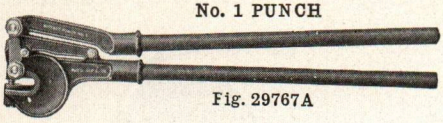


Fig. 29767A

CHANNEL PUNCH

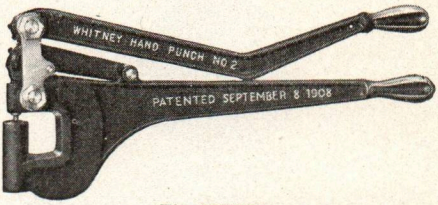


Fig. 29767B

No. 2 PUNCH

Fig. 29767C

No. 1 PUNCHES

This punch has great capacity, is of simple construction, light in weight and strongly built. Punches and dies in 13 sizes, from 3/16 to 9/16 inch, by 1/32nds.

No. 2 PUNCHES

This is a hand metal punch, easily operated, and quickly changed. It can be used anywhere with or without vise. Punches and dies in 13 sizes, from 1/8 to 1/2 inch by 1/32nd. This punch, as well as the No. 1, has given excellent satisfaction in boiler shops, furnace manufacturers, cornice, tank and stack builders, manufacturing plants, machine and repair shops.

CHANNEL PUNCHES

This is an excellent portable channel iron punch. Every part is interchangeable with the No. 2 punch, listed above, punches and dies included.

Number		1	2	Channel Iron
Capacity		3/8-inch Hole 1/4 " Iron	5/16-inch Hole 1/4 " Iron	1/4 in 1/4 Iron
Length	inches	34	23	23
Weight	pounds	22	14	16 1/2
Price	each	**32.00**	**18.50**	**20.50**
" Extra Punches	"	**.50**	**.50**	**.50**
" " Dies	"	**.50**	**.50**	**.50**

Two punches and one die are included with each punch.

No. 10 BALL BEARING HAND PUNCHES

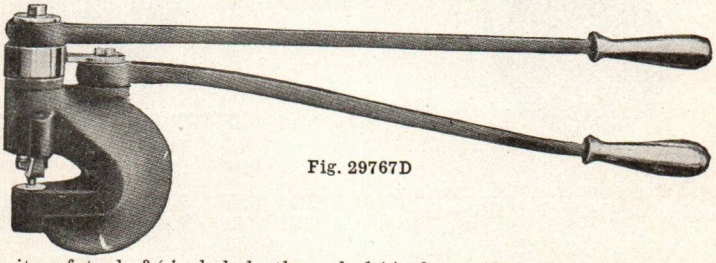


Fig. 29767D

Capacity of tool, 3/8-inch hole through 1/4-inch metal or its equivalent. Depth of throat, 1 1/2 inches. Length of levers, 18 inches. Weight of punch complete with levers, 8 1/2 pounds. This punch will drive rivets as well as punch holes.

Price	each	**18.00**
" Extra Punches and Dies	"	**.50**

LUFKIN MEASURING TAPES

RELIABLE STEEL TAPES

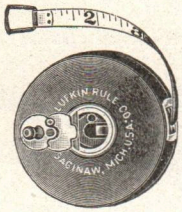


Fig. 27141A

All with double folding flush handle, opened by pressing on opposite side.

Hard leather cases, nickel-plated trimmings. Measurements guaranteed to be perfectly accurate.

Nos. 200 to 208 have tape ⅜ inches wide, Nos. 300 to 306 have tape ½ inch wide, Nos. 343 to 346 have tape ⅝ inches wide, Nos. 351 to 356 have tape ¾ inch wide.

No.	Length Feet	Price Each	No.	Length Feet	Price Each
200	25	**4.50**	305	75	**11.70**
203	50	**7.20**	306	100	**14.40**
204	66	**9.20**	343	50	**9.10**
205	75	**10.40**	345	75	**13.20**
206	100	**12.80**	346	100	**16.20**
207	150	**18.50**	353	50	**10.20**
208	200	**24.00**	355	75	**14.85**
300	25	**5.10**	356	100	**18.20**
303	50	**8.10**	...	...	.....

RIVAL STEEL TAPES

Fig. 27141B

The Rival steel tape has steel case, and marked inches and eighths. Tape is ⅜ inch wide.

No.	Length Feet	Price per Dozen	No.	Length Feet	Price per Dozen
240	25	**33.00**	245	75	**54.00**
243	50	**40.80**	246	100	**69.00**

RELIABLE JUNIOR STEEL TAPES

Fig. 27141C

The Reliable Junior steel tape is furnished with tape ¼ inch wide. Marked feet and 12ths, inches and sixteenths. Add suffix D, when wanted marked feet, 10ths and 100ths of feet, for surveyors' use. Marked metric measure on one side only, at same price.

Marked feet and 12ths one side, feet and 10ths on the other, add .02 per foot, list. Marked feet on one side and metric measure on the other, add .02 per foot, list.

No.	Length Feet	Price per Dozen	No.	Length Feet	Price per Dozen
100	25	**45.00**	105	75	**69.00**
103	50	**55.20**	106	100	**84.00**

TAPES ONLY, NO CASE

0100	25	**27.00**	0105	75	**42.00**
0103	50	**33.00**	0106	100	**54.00**

UNIVERSAL UNION TAPES

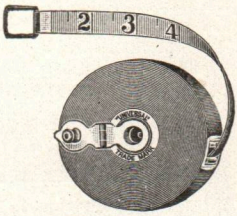


Fig. 27141D

COTTON AND LINEN TAPES

No.	Length Feet	Price per Dozen	No.	Length Feet	Price per Dozen
1020	25	**5.00**	1025	75	**10.00**
1022	40	**7.00**	1026	100	**12.50**
1023	50	**8.00**	....	...	.....

LINEN CORDED TAPES

1030	25	**6.50**	1035	75	**13.00**
1032	40	**8.25**	1036	100	**15.00**
1033	50	**10.00**	....	...	.....

LUFKIN MEASURING TAPES

CHALLENGE

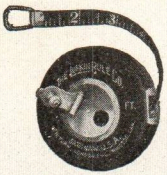


Fig. 27143A

CHALLENGE JUNIOR

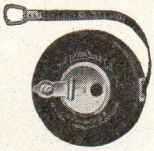


Fig. 27143B

METALLIC

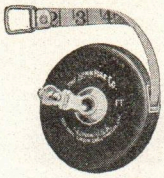


Fig. 27143D

ASS SKIN

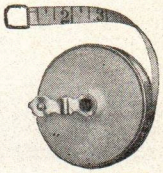


Fig. 27143E

CHALLENGE

This tape is marked feet and 12ths, inches and 8ths. Marked feet, 10ths and 100ths of feet for surveyors' use. Tape is ⅜ inch wide, steel.

Number.....	260	261	263
Length.....feet	25	33	50
Price..per dozen	**39.00**	**42.00**	**48.00**
Number.....	264	265	266
Length.....feet	66	75	100
Price..per dozen	**60.00**	**63.00**	**81.00**

CHALLENGE JUNIOR

This tape has ¼-inch steel tape. Marked feet and 12ths, inches and 16ths. Also marked feet, 10ths and 100ths of feet for surveyors' use.

Number.....	1260	1261	1263
Length.....feet	25	33	50
Price..per dozen	**36.00**	**39.00**	**42.00**
Number.....	1264	1265	1266
Length.....feet	66	75	100
Price..per dozen	**48.00**	**54.00**	**69.00**

BANNER

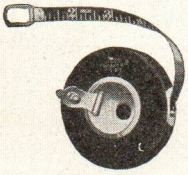


Fig. 27143C

Banner tape has steel case covered with black auto leather. Tape is ⅜ inch wide. Marked one side only, in feet, inches and 8ths.

Number.....	550	553
Length.....feet	25	50
Price.....each	**2.45**	**3.00**
Number.....	555	556
Length.....feet	75	100
Price.....each	**3.90**	**5.00**

METALLIC

The Metallic Tape has hard leather cases. Tape is ⅝ inch wide, marked one side only, in 12ths.

Number.....	500	501	503
Length.....feet	25	33	50
Price.....per doz.	**20.40**	**24.00**	**30.00**
Number.....	504	505	506
Length.....feet	66	75	100
Price.....per doz.	**33.60**	**37.20**	**46.80**

ASS SKIN

Case is brass bound. Tape, cotton, ½ inch wide and marked in feet and inches.

Number....	710	711	712	713
Length..feet	25	33	40	50
Price, per doz.	**3.75**	**4.00**	**4.50**	**5.00**
Number.....	714	715	716	....
Length...feet	66	75	100	....
Price, per doz.	**6.00**	**7.50**	**9.00**	....

FRAME STEEL

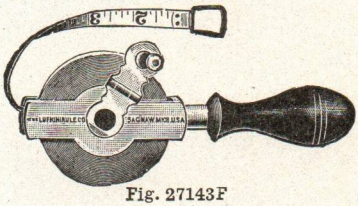


Fig. 27143F

The frame steel tape has four armed frame, tape 150 feet long. Nos. 281 to 288 has tape ⅜ inch wide, Nos. 291 to 298 has tape ½ inch wide.

Number.....	281	283	284	285
Length....feet	33	50	66	75
Price.....each	**3.50**	**4.50**	**5.25**	**6.25**
Number.....	286	287	288	291
Length....feet	100	150	200	33
Price.....each	**7.75**	**12.50**	**15.50**	**4.25**
Number.....	293	294	295	296
Length....feet	50	66	75	100
Price.....each	**5.25**	**6.25**	**7.50**	**9.00**
Number.....	297	298	....	....
Length....feet	150	200	....	....
Price.....each	**13.50**	**17.50**	....	....

LUFKIN RULES

UNBOUND RULES

No. 465

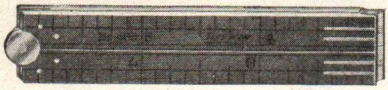


Fig. 15501A

No. 651B

Fig. 15501B

No. 3851

Fig. 15501C

No. 465 has round joint and middle plates, graduated in 8ths and 16ths.
No. 651B has round joint and middle plates, graduated in 8ths and 16ths.
No. 3851 has arch joint and middle plates, graduated in 8ths and 16ths.

Price, No. 465, 1 foot, Four-fold, ⅝-inch Wide.....per dozen		1.75
" " 651B, 2 " " " 1 " "	"	2.50
" " 3851, 3 " " " 1 " "	"	6.00

No. 781, BOUND, DRAFTING SCALES

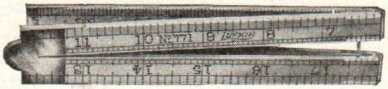


Fig. 15501D

No. 771, has square joint, half bound, graduated in 8ths, 10ths, 12ths and 16ths.
No. 781, has square joint, full bound, graduated in 8ths, 10ths, 12ths and 16ths.
No. 882, has arch joint, full bound, graduated in 8ths, 10ths and 16ths.

Price, No. 771, 2 foot, Four-fold, 1-inch Wide.....per dozen		6.50
" " 781, 2 " " " 1 " "	"	8.00
" " 882, 2 " " " 1⅜ " "	"	10.00

SPECIAL RULES

No. 861A

Fig. 15501E

No. 762B

Fig. 15501F

No. 861A, has arch joint, edge plates, graduated in 8ths, 10ths, 12ths and 16ths.
No. 762B, has square joint, edge plates, graduated in 8ths and 16ths.

Price, No. 861A, 2 foot, Four-fold, 1- inch Wide.....per dozen		8.00
" " 762B, 2 " " " 1⅜ " "	"	11.00

LUFKIN RULES

BOXWOOD CALIPER

No. 171

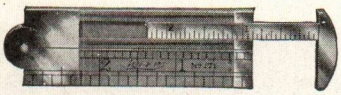


Fig. 15676A

No. 372

Fig. 15676B

The caliper slide is of brass and is accurately machined to fit the T slot in the leg of the rule. All caliper rules are made with caliper left hand, as shown in the illustrations. They can be furnished from factory, with caliper right hand, that is, with the caliper slide in the other leg of the rule (the caliper head or end piece being turned the other way) for 25 cents extra per dozen. Caliper slides are regularly graduated outside edge in 32nds, inside edge in 16ths.

No. 171 has square joint, graduated in 8ths, 10ths, 12ths and 16ths.
No. 372 has square joint, graduated in 8ths, 10ths, 12ths and 16ths.
No. 388, full bound, has arch joint, graduated in 8ths, 10ths, 12ths and 16ths.
No. 862C has arch joint, edge plates, graduated in 8ths, 10ths and 16ths.

Price, No. 171, 6-inch, Two Fold, 1-inch Wide	per dozen		4.50
" " 372, 1-foot, " " 1⅜ inches Wide	"		6.50
" " 388, 1 " Four Fold, 1-inch Wide	"		10.00
" " 862C, 2-foot " " 1⅜ inches Wide	"		12.00

FLEXIBLE SPRING JOINT RULES

RIVET JOINTS

Nos. 8524 AND 8526

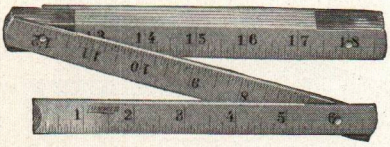


Fig. 15676C

Nos. 8624 AND 8626

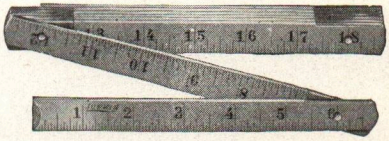


Fig. 15676D

These rules are more particularly adapted for measuring than for laying out work where a rule or straight edge is necessary. When the entire length of the rule is not required for measuring, these joints not open form a very convenient handle. The rivet in the joint is carried through both the wood and the joint. The joints contain a stiff spring which holds the rule rigid when open.

They are regularly graduated in 16ths of inches.

YELLOW ENAMEL FINISH

Price, No. 8524, 4-foot, 6-inch Folds	per dozen	4.00
" " 8526, 6 " 6 " "	"	6.00

WHITE ENAMEL FINISH

Price, No. 8624, 4 foot, 6-inch Folds	per dozen	4.40
" " 8626, 6 " 6 " "	"	6.60

LUFKIN RULES

COMBINATION RULE, LEVEL AND PROTRACTOR, No. 863L

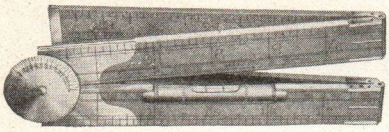


Fig. 15675A

SHRINKAGE
Nos. 8201 TO 8209

Fig. 15675B

COMBINATION RULE, LEVEL AND PROTRACTORS

A two-foot, four-fold boxwood rule, fitted with spirit level and protractor. To obtain any degree or angle required is simple. Graduated one side, inches and 8ths; other side, inches and 16ths, with architect's scales.

Price, No. 863L, 1½ Inches Wide, Arch Joint, Edge Plates, with Drafting Scales, Level and Protractor.....per dozen **24.00**

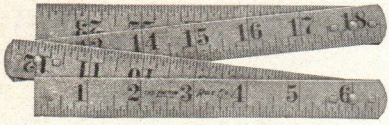
SHRINKAGE

Made of highly finished boxwood, 1½x⅛ inch, brass capped.

Number	8201	8202	8203	8204	8205	8206	8207	8208	8209
Length.....inches	24⅛	24⅙	24⅕	24 3/16	24¼	24⅜	24½	24⅝	24¾
Shrinkage, Per Foot .. "	1/16	1/12	1/10	3/32	⅛	3/16	¼	5/16	⅜
Price.....per dozen	**15.00**	**15.00**	**15.00**	**15.00**	**15.00**	**15.00**	**15.00**	**15.00**	**15.00**

FOLDING STEEL RULES

Nos. 1172 TO 1178



Fi6. 15675C

Nos. 4141 TO 4644

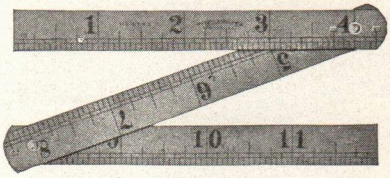


Fig. 15675D

Nos. 1172 TO 1178

Have patent stop joints. Made of tempered steel, ¾ inch wide. Surface of rule is bright with sunken figures and lines. Marked both sides, in inches and 16ths.

Number	1172	1173	1174	1175	1176	1177	1178
Length .....feet	2	3	4	5	6	7	8
Price.....per dozen	**16.80**	**25.20**	**33.60**	**42.00**	**50.40**	**60.80**	**67.20**

POCKET, Nos. 4141 TO 4644

Has patent stop joints. One-half inch wide. Marked one side, one edge inches and 8ths; other side, one edge, inches and 16ths. Figures and graduations are cut into the steel.

Number	4141	4142	4143	4144	4642	4643	4644
Length.....feet	1	2	3	4	2	3	4
" of Joints, inches	4	4	4	4	6	6	6
Price.....per dozen	**9.00**	**15.00**	**22.20**	**30.00**	**15.00**	**22.20**	**30.00**

STARRETT'S TOOLS

SPRING-TEMPERED RULES

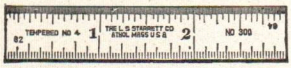


Fig. 5637A

No. 300 has No. 4 graduation; No. 301, No. 1; No. 302, No. 2; No. 306, No. 6; No. 307, No. 7; No. 308, No. 15; No. 309, No. 16.

Thickness, $\frac{3}{64}$ inch or No. 18 gauge.

Length Inches	Width Inches	Price Each	Length Inches	Width Inches	Price Each
1	½	.20	12	1	1.25
2	½	.30	18	1⅛	2.00
3	9/16	.40	24	1¼	2.50
4	⅝	.50	36	1¼	5.00
6	¾	.65	48	1¼	7.00
9	⅞	1.00	..	...	....

SPRING-TEMPERED RULES
WITH GRADUATED END
No. 303

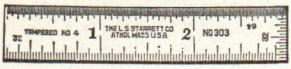


Fig. 5637B

Has No. 4 graduation, and is graduated in 32nds of an inch on opposite sides of one end. Same widths, thicknesses and prices as corresponding lengths of No. 300 rules, given above. In 2 to 24-inch lengths only.

SPRING-TEMPERED RULES
WITH ONE BEVELED EDGE

Fig. 5637C

No. 400 has No. 4 graduation, with 64ths on beveled edge; No. 407 has No. 7 graduation, with 100ths on beveled edge; No. 403 has No. 4 graduation, with 64ths on beveled edge, and graduated in 32nds on opposite sides of one end. In 2 to 24-inch lengths only. Prices same as No. 300.

SPRING-TEMPERED RULES
HEAVY

About $\frac{1}{10}$ inch thick. No. 410 has No. 4 graduation; No. 417, No. 7. Both styles in lengths and widths from 6 to 48 inches. Same as No. 300, given above. Prices the same. No. 410, 60-inch lengths, 16.00; 72-inch lengths, 20.00.

FLEXIBLE RULES

Fig. 5637D

Extremely thin, spring-tempered. Will easily conform to a 2-inch circle. No. 320 has No. 10 graduation; No. 321, No. 11; No. 322, No. 12; No. 323, No. 13; No. 324, No. 14

Length Inches	Width Inches	Price Each	Length Inches	Width Inches	Price Each
1	½	.20	12	½	1.25
2	½	.30	18	¾	2.00
3	½	.40	24	¾	2.50
4	½	.50	36	¾	5.00
6	½	.65	48	¾	7.00
9	½	1.00	..	..	....

SEMI-FLEXIBLE RULES
No. 325

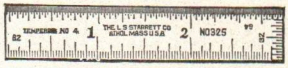


Fig. 5637E

About 1/40 inch thick; heavier than flexible rules and lighter than spring-tempered rules. Made in sizes, 2-inch to 12-inch lengths only. They are of the same widths as corresponding lengths of spring-tempered rules. Prices the same as for No. 320.

NARROW RULES

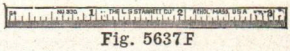


Fig. 5637F

Spring-tempered. About 3/16 inch wide. No. 18 gauge, No. 330; No. 10, No. 331; No. 11, No. 332, 12 graduation.

Length Inches	Price Each	Length Inches	Price Each
4	.50	9	1.00
6	.65	12	1.25

GRADUATIONS

No.	1st Corner	2nd Corner	3rd Corner	4th Corner
1	10,20,50,100	12,24,48	16,32,64	14,28
2	10,20,50,100	12,24,48	16,32,64	8
4	64	32	16	8
6	32	48	50	64
7	64	32	16	100
10	32	64	..	...
11	64	100	..	...
12	50	100	..	...
13	8	16	..	...
14	8	32	..	...
15	10	20	50	100
16	32	64	50	100

STARRETT'S TOOLS

STEEL STRAIGHT EDGES
NOT GRADUATED

No. 380, PLAIN

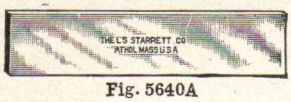


Fig. 5640A

Where lines are to be scribed absolutely straight, or when surfaces must be tested for their precision, an accurate straight edge is generally used.

No. 385, BEVELED

Fig. 5640B

One edge only is beveled, and this to 1/16-inch thick from 1/2 to 5/8-inch back.

Length Inches	Width Inches	Thickness Inches	Price, Each No. 380	Price, Each No. 385
12	1	3/16	1.20	1.50
18	1 1/4	3/16	1.80	2.50
24	1 1/2	3/16	2.40	3.50
36	2	1/4	5.00	6.00
48	2 1/2	1/4	8.00	10.00
60	3	1/4	12.00	15.00
72	3	1/4	16.00	20.00

STEEL STRAIGHT EDGES
GRADUATED

No. 333, NOT BEVELED

Fig. 5640C

Graduated on one side only, one edge in 16ths and the other in 8ths of an inch.

No. 387, BEVELED

Fig. 5640D

Graduated on beveled edge only, in 32nds of an inch.

Length Inches	Width Inches	Thickness Inches	Price, Each No. 383	Price, Each No. 387
12	1	3/16	1.80	2.00
18	1 1/4	3/16	2.50	3.00
24	1 1/2	3/16	3.25	4.25
36	2	1/4	6.25	7.25
48	2 1/2	1/4	10.00	12.00

COMBINATION STRAIGHT EDGES, No. 167

Fig. 5640E

The needle carriers at each end swing on taper studs, and carry needle-pointed brads frictionally held in their split ends. These may be swung to bring the points close to the working edge, and by a slight turn of a knurled nut may be rigidly locked, holding the straight edge bradded to the paper. Graduated combination straight edges are graduated in 32nds.

Length Inches	Width Inches	Price, Each Plain	Price, Each Graduated
18	1 1/4	2.25	3.00
24	1 1/4	2.75	3.50
30	1 1/4	3.50	4.75
36	1 3/4	4.25	5.50
42	1 3/4	5.00	6.75
48	1 3/4	5.75	8.00

Extra needle points, 30 cents per dozen; extra needle holders, 10 cents each. In ordering holders, mention the width of straight edge blade.

ADJUSTABLE METAL EDGES
No. 168

Fig. 5640F

A metal T rail or straight edge with attachments is furnished to secure it to end, or end and side of drafting board or table. The T square used against this ensures more accurate results than a wooden board or table.

Ground perfectly straight and are nickel-plated.

Length Inches	Price Each	Length Inches	Price Each	Length Inches	Price Each
16	2.35	24	3.00	34	3.85
18	2.50	26	3.20	36	4.00
19	2.60	27	3.30	38	4.20
20	2.70	28	3.40	40	4.35
21	2.80	30	3.50	48	5.00
23	2.90	32	3.65	60	6.00

STARRETT'S TOOLS

IMPROVED HOOK RULES

Fig. 5639A

Convenient in taking measurements from round corners, through hubs of pulleys, setting inside calipers, etc.

No. 419 is the No. 303 rule, No. 4 graduation, with hook and with end graduation; No. 420 is the No. 300 rule, No. 4 graduation, with hook; No. 421 is the No. 410 rule, No. 4 graduation, with hook.

Length Inches	Price Each	Length Inches	Price Each
6	**1.00**	18	**2.50**
9	**1.40**	24	**3.00**
12	**1.75**	36	**5.75**

Hooks can be applied to rules of other graduations. Prices the same.

NARROW HOOK RULES

Fig. 5639B

Designed for use in taking measurements through small holes, where the regular hook rules cannot be used. Graduated one side in 32nds; other side in 64ths.

Length Inches	Price Each	Length Inches	Price Each
4	**.75**	9	**1.25**
6	**.90**	12	**1.50**

Can be supplied with Nos. 11 or 12 graduations. Prices the same.

THUMB SLIDE RULES

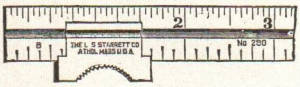


Fig. 5639C

Fitted with thumb slide. Useful in measuring against a shoulder, the width of flanges, collars, etc.

Length Inches	No. of Graduations 290	291	292	297	Price Each
6	4	1	2	7	**1.25**

SLIDE CALIPER RULES

No. 296

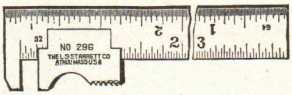


Fig. 5639D

Where many measurements are to be taken on small rods, tubing, etc., it is convenient to have an instrument which measures the object between two contacts. As the caliper square may be too expensive, this slide caliper rule is very satisfactory on this class of work.

Rules are 4 inches long, about 5/8 inch wide and 1/16 inch thick. Graduation is No. 4, with 32nds and 64ths on the front, as shown, and 8ths and 16ths on the back.
Price.....each **1.50**

BLACKSMITHS' RULES

No. 465

Fig. 5639E

With hook and handle. To enable blacksmiths to more conveniently measure hot pieces, and for convenience in the measuring through holes, or from the inside when held against a corner, etc., this rule has been devised. Graduated from the end in 16ths on one side, and from the inside of the hook in 16ths. Graduated 12 inches; length, over all, 16¾ inches.
Price.....each **1.15**

BLACKSMITHS' STEEL RULES

No. 460

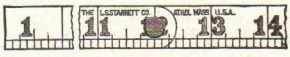


Fig. 5639F

Folding, made of best quality spring-tempered steel. Lock joints, large raised figures. Graduated in 8ths on one side, and 16ths on the other.

Length Inches	Joints Inches	Number of Folds	Price Each
24	12	2	**.50**
36	12	3	**.75**

STARRETT'S TOOLS

RELIABLE TRY SQUARES

No. 60

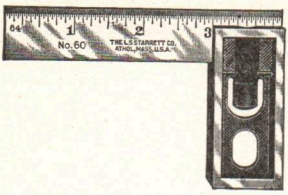


Fig. 5642A

Graduated blade, not hardened. This line of try squares is handsome in design, light and convenient. The blade is not riveted or soldered to the stock, but is firmly held by a patent bolt and nut, by means of which the tool may be readily taken apart, and when worn the blade and stock can be reground, or lapped and put together again as good as new.

Length of Blade Inches	Length of Beam Inches	Price Each
4	2 5/16	1.00
5	3	1.15
6	3 5/8	1.25
9	5 1/16	2.00
12	6	2.75

DOUBLE SQUARES

No. 13

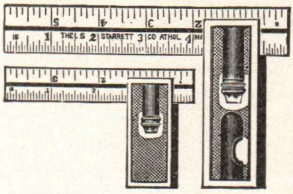


Fig. 5642C

With hardened blade. The sliding scale, shortened or extended full length, makes it more valuable than a full set of the common kind.

Graduates in Nos. 4, 1, 2, 17 and 16 graduations. No. 4 graduations will be sent unless otherwise specified.

A level is contained in the 6, 9 and 12-inch sizes.

Size Inches	Price Each	Size Inches	Price Each
4	*1.65	9	3.00
6	*2.50	12	4.00

*With both blades, and always sent unless otherwise specified.

RELIABLE TRY SQUARES

No. 61

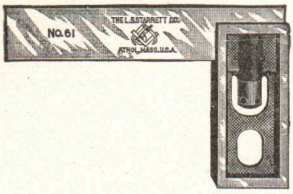


Fig. 5642B

Blade with hardened edge, not graduated.

Length of Blade Inches	Length of Beam Inches	Price Each
4	2 5/16	1.25
5	3	1.50
6	3 5/8	1.75
9	5 1/16	2.25
12	6	3.00
18	9	12.00
24	12	18.00

THIN STEEL TRY SQUARES

No. 21

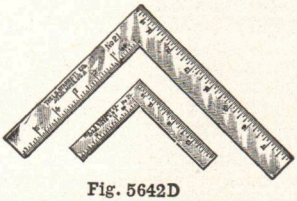


Fig. 5642D

The 2x1 and 3x2-inch sizes are graduated 16ths and 64ths on one side and 32nds and 64ths on other side. All other sizes are graduated 16ths and 32nds both sides.

Size Inches	Thickness Inches	Price Each
2x 1	1/20	1 75
3x 2	1/20	2 25
4x 3	1/16	3.00
6x 4	1/16	4 25
8x 6	1/16	5 50
10x 8	1/16	6.75
12x10	3/32	8.00

STARRETT'S TOOLS

EFFECTIVE AUGUST 1, 1919

SOLID STEEL SQUARES

No. 20

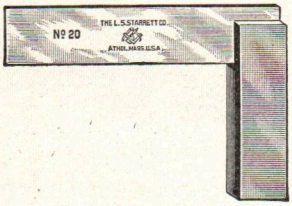


Fig. 5643A

With hardened edge. The 15, 18 and 24-inch sizes are provided with stock supports.

Size *In.	Length †In.	Price Each	Size *In.	Length †In.	Price Each
1	1	**2.50**	9	5 9/16	**11.25**
1½	1½	**3.00**	12	7	**15.00**
2	1⅞	**3.25**	15	8⅝	**25.00**
3	2⅜	**3.75**	18	10½	**28.75**
4½	3½	**5.75**	24	12 5/16	**37.50**
6	4 5/16	**7.50**	..	....	.....

*Size blade inside beam. †Full length of beam.

DOUBLE STEEL SQUARES

No. 14

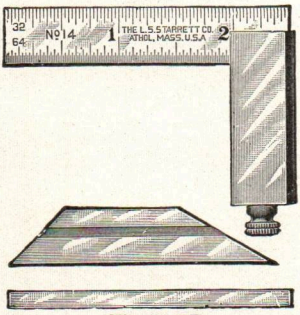


Fig. 5643B

A double steel square with patent 2½-inch sliding scale, and is especially designed for fine toolmakers. Graduated on one side only, in 32nds and 64ths.

No. 14A is square only. No. 14B is square with either bevel or narrow blade. No. 14C is square with both bevel and narrow blade. No. 14C sent unless otherwise specified.

Number.....	14A	14B	14C
Price.....each	**3.00**	**3.25**	**3.50**

GRADUATED STEEL SQUARES

No. 63

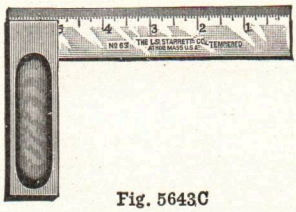


Fig. 5643C

Hardened steel, graduated. This tool has concave depressions in each side of the stock, which not only reduce its weight, but make it more convenient to hold between the thumb and finger while being used.

Size *In.	Length †In.	Price Each	Size *In.	Length †In.	Price Each
2	1½	**2.25**	6	3¾	**6.25**
3	2	**3.25**	9	5	**10.00**
4	2¾	**4.75**	12	6½	**12.00**

*Size of blade inside beam. †Full length of beam.

DIE MAKERS' SQUARES

No. 453

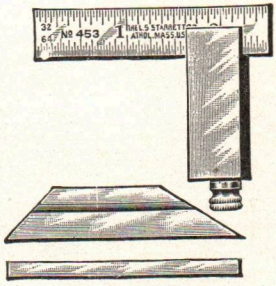


Fig. 5643D

Designed to provide means whereby the blade could be adjusted at an angle with the beam.

No. 453A is square only. No. 453B is square with either bevel or narrow blade. No. 453C is square with both bevel and narrow blade. No. 453C sent unless otherwise ordered.

Number.....	453A	453B	453C
Price.....	**3.50**	**3.75**	**4.00**

STARRETT'S TOOLS

EFFECTIVE AUGUST 1, 1919

COMBINATION SQUARES

No. 11

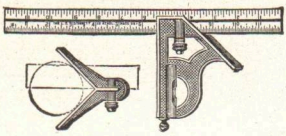


Fig. 5641A

With the adjustable scale this forms one of the most convenient and useful tools ever devised for mechanics' use. With hardened blades, No. 4 graduation.

Size In.	Price, Each With Center Head	Price, Each Without Center Head	Size In.	Price, Each With Center Head	Price, Each Without Center Head
4	**1.75**	**1.25**	12	**3.00**	**2.50**
6	**2.00**	**1.50**	18	**3.75**	**3.25**
9	**2.50**	**2.00**	24	**4.50**	**4.00**

COMBINATION SQUARES

No. 23

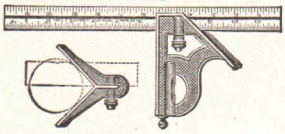


Fig. 5641B

Similar in design to No. 11. Blade is made from good, hard steel, not hardened.

Size Inches	Price, Each With Center Head	Price, Each Without Center Head
6	**2.00**	**1.50**
9	**2.50**	**2.00**
12	**3.00**	**2.50**

DROP-FORGED STEEL COMBINATION SQUARES

No. 33

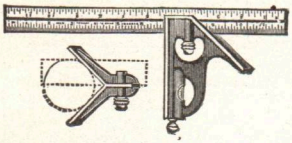


Fig. 5641C

Blades are graduated in Nos. 1, 2, 4, 7 and 16. All squares sent with center heads and No. 4 graduations.

6	**3.25**	**2.50**
9	**3.75**	**3.00**
12	**4.00**	**3.25**
18	**5.00**	**4.25**
24	**5.50**	**4.75**

LARGE COMBINATION SQUARES

No. 17

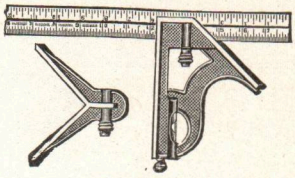


Fig. 5641D

With hardened blade. Similar to No. 11, but is a little larger.

Thickness, $\frac{3}{32}$ inch; 6-inch stock with 4-inch miter.

Size Inches	Price, Each With Center Head	Price, Each Without Center Head
18	**5.50**	**4.50**
24	**6.00**	**4.75**

Always sent with center head unless otherwise specified.

SPECIAL STANDARD SQUARES

No. 8

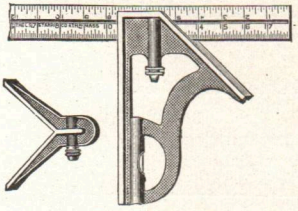


Fig. 5641E

Similar to No. 11, but is heavier and larger. For those who wish to keep a reliable standard. With hardened blade, without center head.

Size Inches	Width Inches	Thickness Inches	Stock Inches	Price Each
18	$1\frac{1}{2}$	$\frac{1}{10}$	$8\frac{1}{4}$	**6.25**
24	$1\frac{1}{2}$	$\frac{1}{10}$	$8\frac{1}{4}$	**7.50**
Center Head only.....				**1.25**

CENTER SQUARES

No. 32

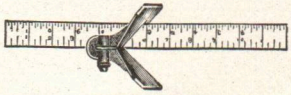


Fig. 5641F

With broader sides than those used on No. 11 combination squares.

Length of Blade..in.	12	18	24
Price.....each	**2.00**	**2.75**	**3.25**
Center Head only.....			**1.00**

STARRETT'S TOOLS

EFFECTIVE AUG. 1, 1919

IMPROVED BEVEL PROTRACTORS

No. 12

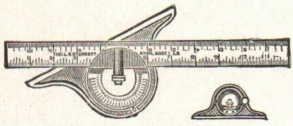


Fig. 14322A

An adjustable rule, held firmly at any point by a thumb nut, passes through a revolving turret, which is nicely graduated in degrees from 0 to 180, both right and left, and can be accurately adjusted to show any angle.

Length. inches	9	12	18	24
Price ....each	**3.50**	**3.75**	**4.50**	**5.00**

Protractor Head only, with Level Attachment..... **2.50**

NEW BEVEL PROTRACTORS

No. 490

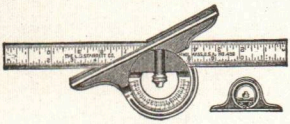


Fig 14322B

Has head extending both sides of the blade. This greatly increases the usefulness of the tool, as the same angles may be transferred from either side of the frame without resetting.

The turret is graduated to read both ways from 0 to 180 degrees.

Length. inches	9	12	18	24
Price....each	**4.50**	**4.75**	**5.75**	**6.25**

Protractor Head only, with Level Attachment..... **3.50**

NEW BEVEL PROTRACTORS

No. 491

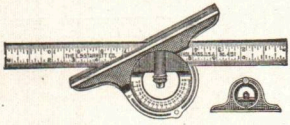


Fig. 14322C

Same as No. 490, except head is made with checked finish to match finish of No. 11 combination square.

Length. inches	9	12	18	24
Price....each	**4.50**	**4.75**	**5.75**	**6.25**

Protractor Head only, with Level Attachment..... **3.50**

COMBINATION SETS

No. 9

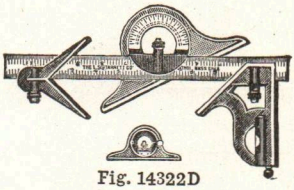


Fig. 14322D

Consists of No. 11 combination square and 7-inch bevel protractor No. 12.

Length. inches	9	12	18	24
Price.....each	**5.00**	**5.50**	**6.25**	**7.00**

No. 433

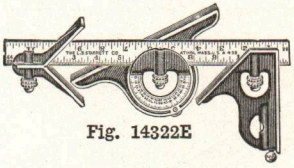


Fig. 14322E

Consists of No. 33 combination square and No. 492 protractor head.

Length. inches	9	12	18	24
Price....each	**6.25**	**6.50**	**7.50**	**8.00**

No. 434

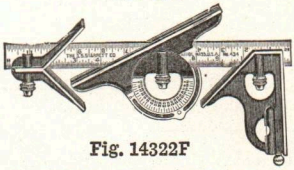


Fig. 14322F

Consists of No. 33 combination square and No. 490 protractor head.

Length. inches	9	12	18	24
Price....each	**7.25**	**7.50**	**8.50**	**9.00**

No. 435

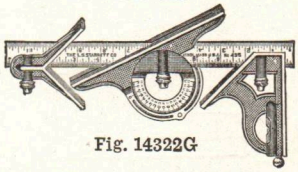


Fig. 14322G

Consists of No. 11 combination square and No. 491 protractor head.

Length. inches	9	12	18	24
Price....each	**6.00**	**6.50**	**7.25**	**8.00**

All combination sets sent with No. 4 graduations, unless otherwise specified.

STARRETT'S TOOLS

UNIVERSAL BEVELS
No. 15

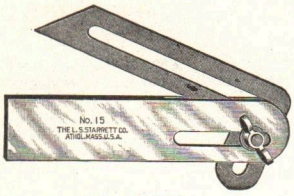


Fig. 5645A

The set-off in the blade increases its capacity and usefulness for bevel gear work, etc., so that any angle, however slight, may be obtained.

Price, 3-inch.....each **1.50**

IMPROVED BEVELS
No. 47

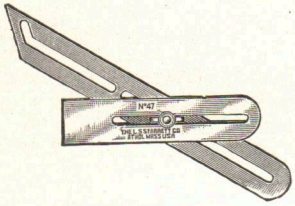


Fig. 5645B

Has slotted blade and stock, thus admitting of adjustments that cannot be obtained with a common bevel.

Size.....	inches	6	9	12
Stock.....	"	3½	4¾	6
Price.....	each	**1.25**	**1.50**	**1.75**

COMBINATION BEVELS
No. 49

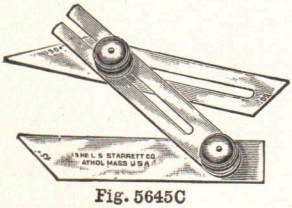


Fig. 5645C

This bevel has a stud riveted in the straight edge stock or head, on which its split blade is hinged, so as to swing over the stock, and be clamped at any angle.

Price.....each **2.00**

PROTRACTORS
No. 193

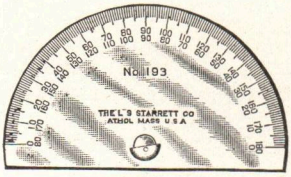


Fig. 5645D

Used for setting bevels Nos. 15, 47 and 49 at any desired angle, thus converting them into bevel protractors.

Price.....each **1.00**

PROTRACTORS
No. 19

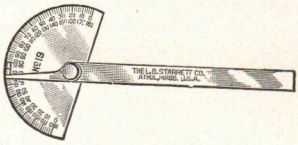


Fig. 5645E

Graduated in degrees from 0 to 90, both ways. The blade is 6 inches long, and by means of a patent lock joint, is set firmly by a slight turn of the nut.

Price.....each **1.75**

PROTRACTORS
No. 183

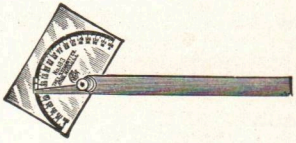


Fig. 5645F

Similar to No. 19, but with rectangular head, giving four working faces, also two rows of figures reading both ways to show the complementary degrees.

The blade is 6 inches long, and by means of a patent lock joint, is held firmly by a slight turn of the nut.

Price.....each **2.00**

STARRETT'S TOOLS

EFFECTIVE AUGUST 1, 1919

CALIPER SQUARES

No. 25

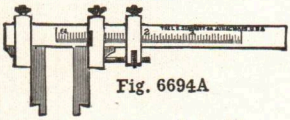


Fig. 6694A

For both outside and inside measure. The beam is graduated in 64ths on one side and 100ths on the other.

Size Inches	Price, Each With Adj. Screw	Price, Each Without Adj. Screw
3	**6.00**	**5.25**
4	**7.50**	**6.50**
6	**10.00**	**8.00**

With hardened jaws, extra, 1.50. In leather case, extra, 1.00. Sent with adjusting screw and without case, unless otherwise specified.

MICROMETER CALIPER SQUARES

No. 28

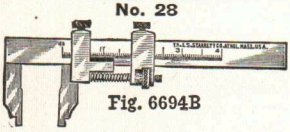


Fig. 6694B

For outside and inside measure. One side of beam is graduated in 64ths, other side in 40ths.

Size Inches	Price, Each With Case	Price, Each Without Case
4	**11.75**	**11.00**
6	**14.50**	**13.50**
9	**18.75**	**17.50**
12	**22.50**	**21.00**

Sent without case, unless otherwise specified.

POCKET SLIDE CALIPERS

No. 425

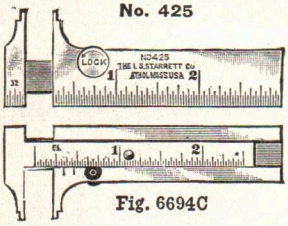


Fig. 6694C

The improved clamping device is a valuable feature. Graduated in 32nds and 64ths. No. 425, graduated 32nds on stock, 100ths on slide. Prices the same. Specify style in ordering.

Size.....inches	3	5
Price.....each	**3.00**	**4.00**

CALIPER SQUARES

No. 426

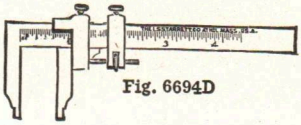


Fig. 6694D

For both outside and inside measure. The beam is graduated in 64ths on one side and 100ths on the other.

Size Inches	Price, Each With Adj. Screw	Price, Each Without Adj. Screw
3	**6.00**	**5.25**
4	**7.50**	**6.50**
6	**10.00**	**8.00**

With hardened jaws, extra, 1.50. In leather case, extra, 1.00. Sent with adjusting screw and without case, unless otherwise ordered.

SLIDE RULE CALIPER AND CIRCUMFERENCE GAUGES

No. 424

Fig. 6694E

This gauge has a double function, being graduated to read the circumference as well as the diameter of the article measured, the relation of the circumference to diameter being shown by the graduations on upper corners of the rule. Capacity, 3½ inches, about 11 inches in circumference. Makes a first-class slide rule caliper of large scope.

Price.....each **4.00**

BUTTON GAUGES

No. 431

Fig. 6694F

This gauge is of the same size and is similar to the No. 425 pocket slide caliper. The difference is that it is graduated on the slide only to 40ths of an inch.

Size.....inches	3	5
Price.....each	**3.00**	**4.00**

STARRETT'S TOOLS

½-INCH, No. 232 MICROMETER CALIPERS

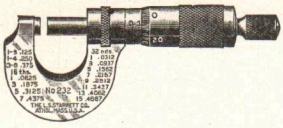


Fig. 19070A

For measurement by 1000ths up to ½ inch. Has locknut and ratchet stop. Short anvil, for use in places where the ordinary anvil is too long to be inserted.
Price.....each **7.00**

½-INCH, No. 215 MICROMETER CALIPERS

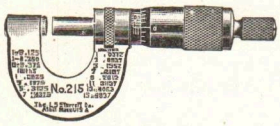


Fig. 19070B

For measurement by 1000ths up to ½ inch. Has locknut and ratchet stop.
Price.....each **7.00**

½-INCH, No. 216 MICROMETER CALIPERS

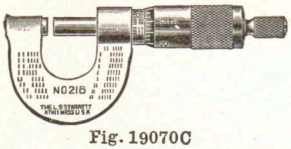


Fig. 19070C

For measurement by 1000ths up to ½ inch. Has ratchet stop, but no locknut.
Price.....each **6.25**

½-INCH, No. 576 MICROMETER CALIPERS

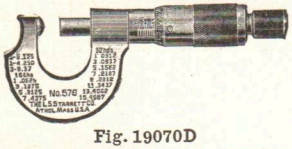


Fig. 19070D

For measuring tubing, by 1000ths up to ½ inch, with decimal equivalents stamped on frame. Ratchet stop.
Price.....each **7.00**

For micrometers measuring by 10000ths add 1.00 to above prices. For cases, add 85 cents.

1-INCH, No. 204 MICROMETER CALIPERS

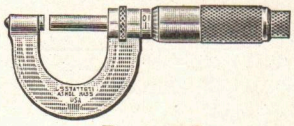


Fig. 19070E

For measurement by 1000ths up to 1 inch. Has ratchet stop and locknut. Quick adjusting. This feature will be appreciated by mechanics.
Price.....each **12.50**

1-INCH, No. 230 MICROMETER CALIPERS

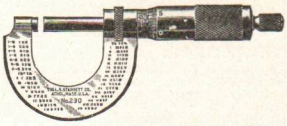


Fig. 19070F

For measurements by 1000ths up to 1 inch. Has locknut and ratchet stop.
Price.....each **8.25**

1-INCH, No. 3 MICROMETER CALIPERS

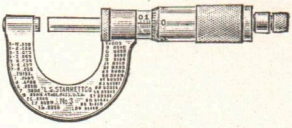


Fig. 19070G

For measurements by 1000ths up to 1 inch. Has locknut and ratchet stop.
Price.....each **8.25**

1-INCH, No. 203 MICROMETER CALIPERS

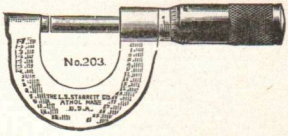


Fig. 19070H

For measurements by 1000ths up to 1 inch. Has neither locknut nor ratchet stop.
Price.....each **7.00**

For micrometers measuring by 10000ths add 1.00 to above prices. For cases, add 85 cents.

STARRETTS' TOOLS

MICROMETERS
1-INCH, No. 238

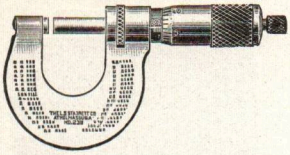


Fig. 5646A

For measurement by 1000ths up to 1 inch. Has ratchet stop and locknut. Made with frame and other parts much heavier than the regular pattern.

Price.....each **10.00**
" .....case only **1.00**

1-INCH, No. 207

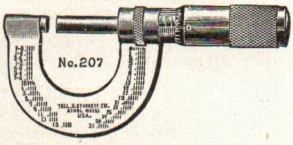


Fig. 5646B

For measurements by 10000ths up to 1 inch. Has locknut but no ratchet stop.

Price.....each **9.25**

1-INCH, No. 202

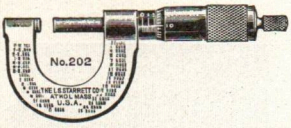


Fig. 5646C

For the measurements by 1000ths up to 1 inch. Has ratchet stop but no locknut.

Price.....each **7.50**

2-INCH, No. 2

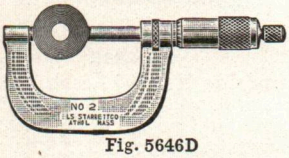


Fig. 5646D

For measurements by 1000ths, from 1 to 2 inches. Has locknut, ratchet stop and 1 inch test gauge.

Price.....each **9.00**

For micrometers measuring by 10000ths add 1.00 to above prices. For cases add 85 cents, 2 inch size, $1.00.

MICROMETERS
2-INCH, No. 2A

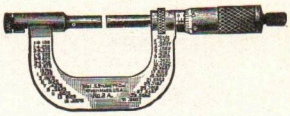


Fig. 5646E

For measurements by 1000ths from 1 to 2 inches. Has locknut, ratchet stop and 1 inch test gauge. Fitted with No. 212 attachment with which tool can be converted into 1 inch.

Price.....each **11.50**

2-INCH, No. 217

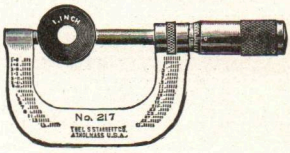


Fig. 5646F

For measurements by 1000ths from 1 to 2 inches. Has locknut and 1 inch test gauge but no ratchet stop.

Price.....each **8.50**

MICROMETERS WITH FINGER RING, No. 220

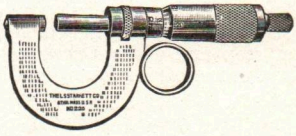


Fig. 5646G

For measurements by 1000ths up to 1 inch. With locknut and ratchet stop.

Price.....each **9.25**

No. 221

For measurements by 1000ths up to ½ inch. With locknut and ratchet stop.

Price.....each **8.00**

STARRETT'S TOOLS

EFFECTIVE AUGUST 1, 1919

MICROMETER CALIPERS

No. 226

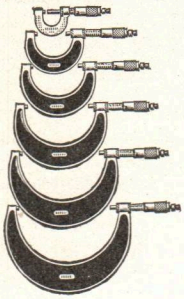


Fig. 5648A

These calipers meet the demand for accurate gauges at a low price. They are better adapted for general use than the vernier or bar micrometer, as they can be set quickly for the different measurements and are more easily read.

Each caliper is graduated to read by thousandths of an inch, is furnished with patent lock nut, and is sent with or without ratchet stop as desired.

The frames are drop-forged from bar steel and are nicely finished. The 1-inch has the decimal equivalents stamped on the frame. The other sizes are marked to show their capacity. Standards for use in adjusting these calipers will be furnished when desired.

Calipers will be supplied singly or in sets as desired and will be sent with ratchet stop and without leather case or standard unless otherwise ordered.

Size Inches	Capacity Inches	Price, Each Without Ratchet Stop	With Ratchet Stop	Price Cases Each
*1	.....	7.75	8.25	.85
2	1 to 2	7.00	7.50	1.00
3	2 "3	8.25	8.75	1.25
4	3 "4	9.00	9.50	2.00
5	4 "5	10.00	10.50	2.25
6	5 "6	10.75	11.25	2.50

*With decimal equivalents stamped on frame.

For calipers in sets, see right-hand column.

MICROMETER SETS

No. 226

SET OF THREE

Fig. 5648B

No. 226A

Comprising No. 650 1-inch; No. 226, 2 and 3-inch, all without ratchet stop.

Price, without Case.....each **21.50**
" with Case..... " **24.00**

No. 226B

Comprising No. 650 1-inch; No. 226, 2 and 3-inch, all with ratchet stop.

Price, without Case.....each **23.00**
" with Case..... " **25.50**

STANDARDS

Price, 2 in Set.....per set **2.50**

SET OF SIX

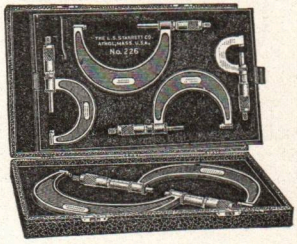


Fig. 5648C

No. 226E

Comprising No. 650 1-inch, No. 226, 2, 3, 4, 5, and 6-inch, all without ratchet stop.

Price, without Case.....each **51.25**
" with Case..... " **56.25**

No. 226F

Comprising No. 650 1-inch; No. 226, 2, 3, 4, 5 and 6-inch, all with ratchet stop.

Price, without Case.....each **54.25**
" with Case..... " **59.25**

STANDARDS

Price, 5 in Set.....per set **7.50**

STARRETT'S TOOLS

EFFECTIVE AUGUST 1, 1919

INSIDE MICROMETERS

No. 120

SET A

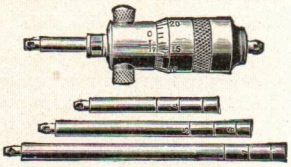


Fig. 5647A

No. 120 has screw and nut same as the Improved No. 3 micrometer caliper and is read in thousandths. The rods are provided with hardened steel adjustable anvils in ends, which permits adjusting for wear. A small binding screw locks rods when set. Rods are marked in ½-inch divisions and set to a similar line on a projection of the barrel.

When so ordered an auxiliary handle accompanies Sets A, B and D, which is used by removing the nut opposite the locknut and screwing the handle in place of same.

SET C

Fig. 5647B

Set A has 4 rods, to measure from 2 to 8 inches. Set B has 7 rods to measure from 2 to 12 inches. Set C has 4 rods to measure from 8 to 32 inches. Set D comprises Sets A and C.

Set	Price, Each With Case	Price, Each Without Case
A	6.50	5.50
B	7.50	6.25
C	9.75	7.75
D	15.25	13.25

Sent with case unless otherwise ordered.
Extra rods at .06 per inch

HANDLES

Fig. 5647C

Price, Extra ..... each .75

INSIDE MICROMETERS

No. 124

SET A

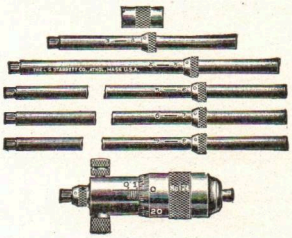


Fig. 5647D

Like No. 120, is designed for internal and linear measurements, such as measuring cylinders, rings; also for setting calipers, comparing gauges, etc. The micrometer screw in the head has ½-inch movement in Sets A and B, 1-inch in Set C, and by means of the extension rods furnished, the sizes as given below for each set can be obtained.

SET C

Fig. 5647E

Set A has 6 rods and ½-inch gauge to measure from 2 to 8 inches. Set B has 10 rods and ½-inch gauge to measure from 2 to 12 inches. Set C has 4 rods and one 1-inch and two 2-inch gauges, to measure from 8 to 32 inches. Set D comprises Sets A and C and measures from 2 to 32 inches.

Set	Price, Each With Case	Price, Each Without Case
A	7.00	6.00
B	8.25	7.00
C	10.50	8.50
D	16.50	14.50

Price, Handles, Extra..... ..... .75

STARRETT'S TOOLS

INSIDE MICROMETER CALIPERS No. 121

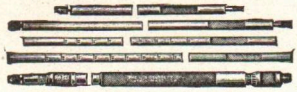


Fig. 18971A

The long rods are made to couple together neatly, accurately and firmly, as if but one piece. It was designed for and is largely used by the Government in navy yards and arsenals. Furnished in case.

Set No.	Number Rods	Capacity Inches	Price per Set
A	1	32 to 57	**32.00**
B	2	32 " 82	**38.00**
C	3	32 " 107	**47.00**

UNITED STATES GOVERNMENT MICROMETER CALIPER GAUGES, No. 127

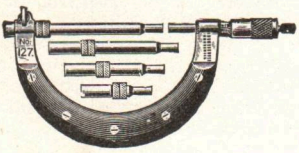


Fig. 18971B

These gauges were designed and made to meet the requirements of the Government in making big guns and other work in the ordnance department of the Government shops, where they are now used.

Number.....	127A	127B	127C
Capacity...inches	0 to 4	4 to 8	8 to12
Price.....each	**32.00**	**47.00**	**63.00**

Furnished in case without extra charge.

MICROMETER CALIPER GAUGES No. 126

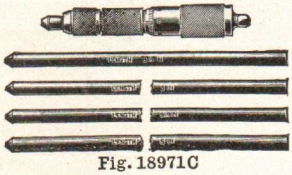


Fig. 18971C

For close internal measurements indicating 1000ths, where a definite distance in inches is not essential.

Capacity, 2½ to 10 inches (with 5 rods). Sent without case unless otherwise ordered.

Price.....per set **2.50**
" in Leather Case..... " **3.50**

ADJUSTABLE CALIPER GAUGES No. 125

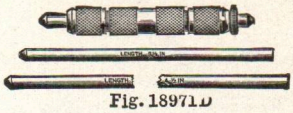


Fig. 18971D

Designed for internal measurements of large cylinders and of distances between uprights. Made from steel throughout and nicely finished.

Capacity Inches	Number of Rods	Price per Set
2½ to 6¾	3	**1.00**
6 " 16	3	**1.25**

Diameter of steel rod, .150 inch. Extra rods, 3 cents per inch.

PATENT 6-INCH MICROMETER CALIPERS, No. 128

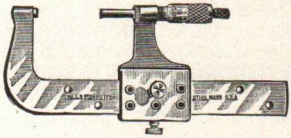


Fig. 18971E

No. 128 will measure round work to 4¼ inches, and flat work to 6 inches. It is rigid and accurate. It can be quickly set to exact position, from 1 inch to 6 inches, by inserting a plug as shown.

Price.....each **40.00**
" with Leather Case..... " **42.00**

Sent in case, unless otherwise ordered.

MICROMETER CALIPER STANDS No. 206

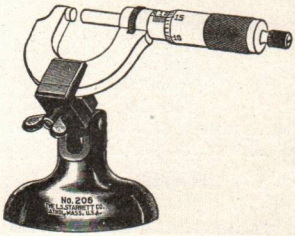


Fig. 18971F

With the use of a micrometer caliper stand the mechanic can use two hands in measuring material.

Price.....each **2.50**

STARRETT'S TOOLS

FIRM-JOINT CALIPERS

IMPROVED

No. 26 OUTSIDE

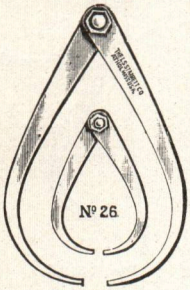


Fig. 2413A

No. 27 INSIDE

Fig. 2413B

Capacity is about one-third greater than the size given.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
3	.40	10	.90	20	2.50
4	.50	12	1.00	*24	3.00
5	.55	14	1.50	30	5.00
6	.65	16	1.75	36	6.00
8	.80	18	2.10	..	....

FIRM-JOINT CALIPERS

SCREW-ADJUSTING

No. 34 OUTSIDE

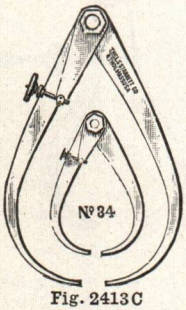


Fig. 2413C

No. 35 INSIDE

Fig. 2413D

Can be set to any degree of uniform tension.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
4	.90	12	1.75	20	2.75
6	1.00	14	2.00	*24	3.50
8	1.25	16	2.25	30	6.00
10	1.50	18	2.50	36	7.00

*Nos. 27 and 35 are not made larger than 24 inches.

LOCK-JOINT CALIPERS

No. 39 INSIDE

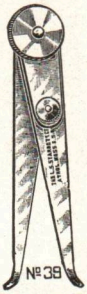


Fig. 2413E

No. 38 OUTSIDE

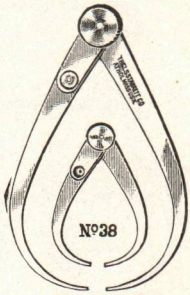


Fig. 2413F

Can be instantly adjusted to their full extent and as quickly locked firm in the joint.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
4	.90	10	1.50	18	2.50
5	.95	12	1.75	20	2.75
6	1.00	14	2.00	24	3.50
8	1.25	16	2.25	..	....

LOCK-JOINT TRANSFER CALIPERS

No. 37 INSIDE

Fig. 2413G

No. 36 OUTSIDE

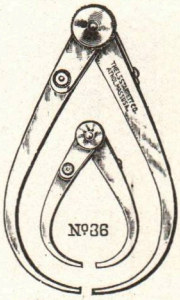


Fig. 2413H

In addition to common use, may be used inside of chambered cavities, over flanges, etc.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
4	1.25	10	2.00	18	3.00
5	1.40	12	2.25	20	3.50
6	1.50	14	2.50	24	4.25
8	1.75	16	2.75	..	....

STARRETT'S TOOLS

YANKEE CALIPERS

OUTSIDE No. 79

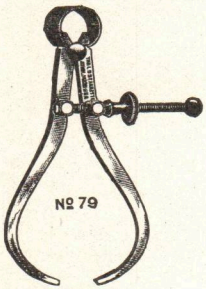


Fig. 2412A

INSIDE No. 73

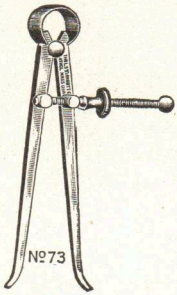


Fig. 2412B

Yankee Calipers and Dividers are manufactured under the Fay patent, are not quite as heavy as the Fay, and cost less.

Size In.	Price, Each Solid Nut	Price, Each Spring Nut	Size In.	Price, Each Solid Nut	Price, Each Spring Nut
2½	.65	.80	6	.85	1.00
3	.70	.85	8	1.00	1.15
4	.75	.90	10	1.35	1.50
5	.80	.95	12	1.50	1.65

YANKEE SPRING DIVIDERS

No. 83

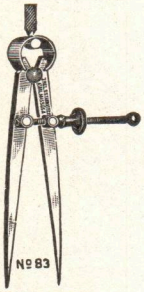


Fig. 2412C

No. 84

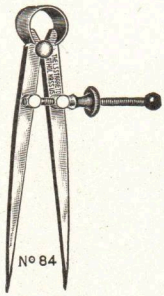


Fig. 2412D

All sizes are supplied with either solid or quick adjusting nut. Sent with solid nut unless otherwise ordered.

Size In.	Price, Each Solid Nut	Price, Each Spring Nut	Size In.	Price, Each Solid Nut	Price, Each Spring Nut
2½	.65	.80	6	.85	1.00
3	.70	.85	8	1.10	1.25
4	.75	.90	10	1.35	1.50
5	.80	.95	12	1.50	1.65

YANKEE CALIPERS

INSIDE No. 81

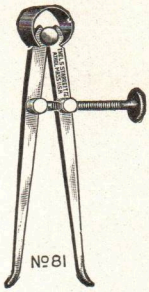


Fig. 2412E

KEYHOLE No. 82

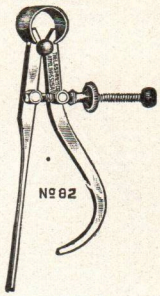


Fig. 2412F

Spring nut may be used on No. 82, but not on No. 81.

Size Inches	Price, Each No. 81 Solid Nut	Price, Each No. 82 Solid Nut	Price, Each No. 82 Spring Nut
3	...	.70	.85
4	.75	.75	.90
5	.80	...	...
6	.85	...	...

THREAD CALIPERS

INSIDE No. 184

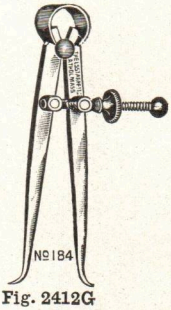


Fig. 2412G

OUTSIDE No. 179

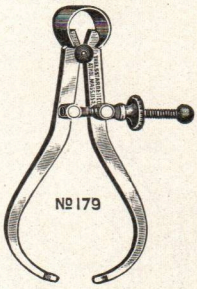


Fig. 2412H

No. 184 is designed for measuring the diameter at bottom of threads. No. 179 is designed for measuring the diameter at bottom of threads on the outside of screws.

Size Inches	Price, Each Solid Nut	Price, Each Spring Nut
4	.75	.90
5	.80	.95
6	.85	1.00

Sent with solid nut, unless otherwise specified.

STARRETT'S TOOLS

FAY PATENT CALIPERS

OUTSIDE
No. 75

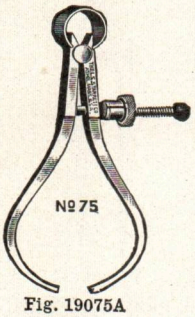


Fig. 19075A

INSIDE
No. 74

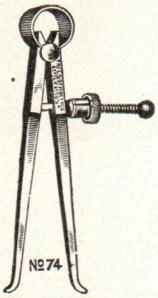


Fig. 19075B

These calipers will be sent with spring nut unless otherwise ordered.

Size Inches	Price, Each Solid	Price, Each Spring	Size Inches	Price, Each Solid	Price, Each Spring
2½	1.00	1.15	5	1.10	1.25
3	1.00	1.15	6	1.35	1.50
4	1.10	1.25	8	1.60	1.75

TOOLMAKERS' CALIPERS

INSIDE
No. 274

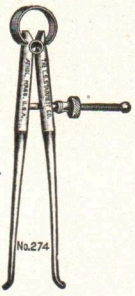


Fig. 19075E

OUTSIDE
No. 275

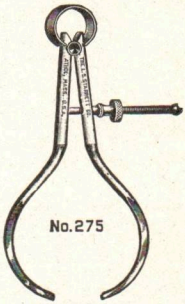


Fig. 19075F

Made from round stock, with legs drawn down, making them hard and stiff.

Size Inches	Price, Each No. 274	Price, Each No. 275	Size Inches	Price, Each No. 274	Price, Each No. 275
2	1.00	1.00	5	1.50	1.50
3	1.25	1.25	6	1.75	1.75
4	1.50	1.50	..	....	....

FAY PATENT CALIPERS

THREAD
No. 76

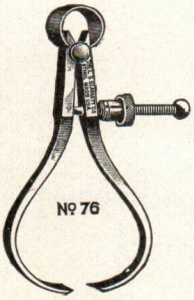


Fig. 19075C

INSIDE
No. 78

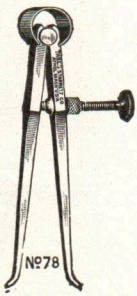


Fig. 19075D

No. 76, sent with spring nut, unless otherwise ordered. No. 78, not made to receive the same spring nut.

Size Inches	Price, Each — No. 76 — Solid Nut	Price, Each — No. 76 — Spring Nut	Price, Each — No. 78 Solid Nut
3	1.00	1.15	....
4	1.10	1.25	1.10
5	1.10	1.25	1.10

DIVIDERS

FAY PATENT
No. 77

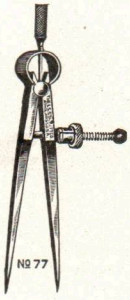


Fig. 19075G

TOOLMAKERS'
No. 277

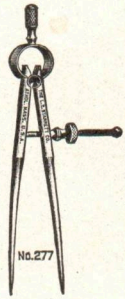


Fig. 19075H

Size Inches	Price, Each — No. 77 — Solid Nut	Price, Each — No. 77 — Spring Nut	Price, Each — No. 277 Solid Nut
2	....	....	1.00
2½	1.00	1.15	....
3	1.00	1.15	1.25
4	1.25	1.40	1.50
5	1.25	1.40	1.50
6	1.60	1.75	1.75
8	1.85	2.00	....

STARRETT'S TOOLS

HERMAPHRODITE CALIPERS

FIRM-JOINT No. 41 — LOCK-JOINT No. 42

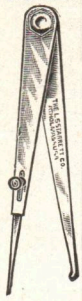


Fig. 5649A

Fig. 5649B

No. 41 has the adjustable point, as well as the improved firm-joint.

No. 42 has the adjustable point, lock-joint and sensitive adjustment.

Size Inches	Price, Each No. 41	No. 42
4	.65	1.00
6	.80	1.15
8	1.00	1.35
10	1.20	1.60

CALIPERS

No. 44

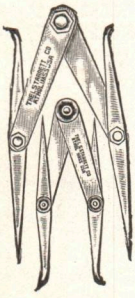


Fig. 5649C

No. 444

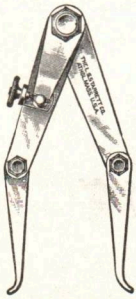


Fig. 5649D

No. 44

Double as will be noted from the engraving. Combine dividers, inside and outside calipers. They have the improved firm friction joints.

Size	inches	6	8
Price	each	1.25	1.50

No. 444

May be used for inside or outside work. Have improved firm friction joints and sensitive screw adjustment.

Size	inches	6	8
Price	each	1.25	1.50

DIVIDERS

LOCK-JOINT No. 43 — PATENT No. 92

Fig. 5649E

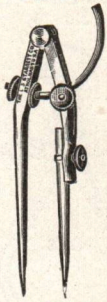


Fig. 5649F

No. 43

With improved lock-joint attachment and sensitive adjustment. Light and stiff.

Size	inches	6	8	10
Price	each	1.00	1.25	1.50

No. 92

The quadrant passes through the leg and the clamp screw frictionally locks it firm. Adjustable point.

Size	inches	6	7	8	9
Price, plain,	each	1.10	1.15	1.25	1.35
" N. P.	"	1.35	1.40	1.50	1.60

Sent plain unless otherwise ordered.

UNIVERSAL DIVIDERS

No. 89

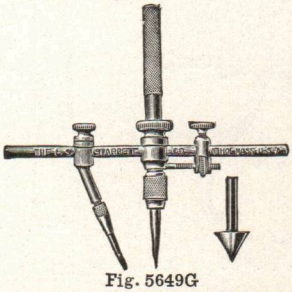


Fig. 5649G

Price, with 4-inch beam and V Center Point	each	*2.00
" Extra Steel Points	"	.10
" Needle Points	"	.15
" Pen Attachment	"	1.50
" Complete, all Attachments as above, also with Straight Point and Socket, extra Beam, and Coupling. Comp.		4.85

*Sent unless otherwise ordered.

STARRETTS' TOOLS

IMPROVED EXTENSION DIVIDERS—No. 85

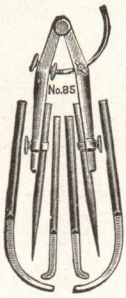


Fig. 5650A

With auxiliary caliper legs, which, together with a common pencil, form convenient combinations. Sent complete unless otherwise ordered.

Size Inches	Will Scribe Circle Inches	Will Caliper Outside Inches	Will Caliper Inside Inches	Price With Legs Only	Price Complete Each
7	22	11	13	**1.50**	**2.50**
9	30	14	16	**1.75**	**2.75**
12	40	17	19	**2.50**	**3.50**

IMPROVED BRONZE DIVIDERS No. 90

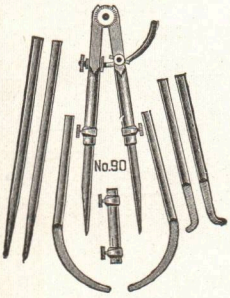


Fig. 5650B

The joint is large and firm. The patent locking nut between the arms, against which a spiral spring acts, is a valuable feature. Will caliper 10 inches outside and 12½ inches inside.

Price, with Short Points Only.each **2.25**
" Complete..... **4.00**

Sent complete unless otherwise ordered.

BLACKSMITHS' CALIPERS No. 173

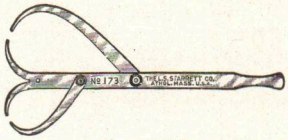


Fig. 5650C

The caliper is 22 inches in length over all, and has a 6-inch caliper on one side and a 12-inch caliper on the other side.

The difference in the length of arms prevents using the wrong caliper when there is but slight variation in the work measured.

Price.....each **2.00**

BALL POINTS No. 88

Fig. 5650D

This attachment consists of four balls of 1 9/16 inches, 1 inch, ¾ inch, and ½ inch diameter, respectively, and a holder which fits either divider leg or trammel head. It is used to form a seat for the divider leg in describing circles around a hole. In ordering this set for use with trammels, please give tool number of the trammel, so that the proper holder may be sent.

Price, Complete with Four Balls and Holder.....each **1.25**
Price, either Ball or Holder.... " **.25**

STARRETT'S TOOLS

EXTENSION BEAM TRAMMELS
No. 51

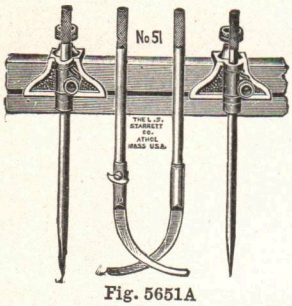


Fig. 5651A

Has an opening through the under side to accommodate the extension, giving width and stiffness in proportion to the length required for large work, while it is equally well adapted to receive a narrow beam for light work.

Price, Complete.....each **3.25**
" without Caliper Legs... " **2.50**
Sent complete, unless otherwise ordered.

EXTENSION STEEL BEAM TRAMMELS
No. 58

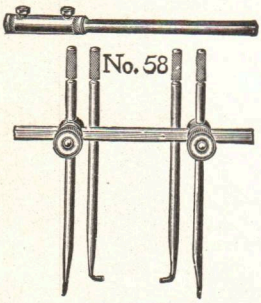


Fig. 5651B

Fine adjustments are made by a slight rotation of one or the other eccentric point, which by friction springs retain it when the nut is loosened. Regular finish, plain.

Size Inches	Number Sections	Price, Each Plain	Price, Each Plated
14	1	2.20	2.50
28	2	2.60	3.00
42	3	3.00	3.50

Price extra sections, with couplings, each 50 cents; caliper points, plain, per pair, 50 cents, plated 60 cents.

NEW TRAMMELS
No. 59

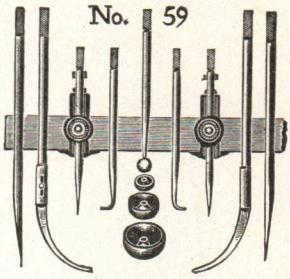


Fig. 5651C

Illustration shows the trammels fastened to a wooden beam, which may be any size from ¾ to 1⅝ inches in width, and of any thickness desired.

Trammels are furnished with or without auxiliaries.

Price, Trammel Heads .....each **2.00**
" Balls and Holder.....per set **1.25**
" Small Caliper Legs..per pair **.50**
" Large " " .. " **.75**
" Divider Points..... " **.50**
" Complete .....per set **4.75**
Trammel heads with one pair of points sent, unless otherwise ordered.

IMPROVED TRAMMEL POINTS
No. 50

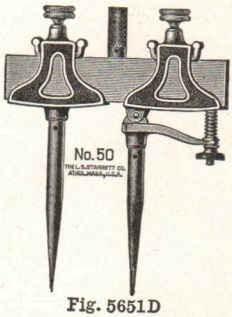


Fig. 5651D

Either point can be removed and the pencil socket accompanying each pair put in its place.

Price, with 3-inch Points, Adjustable...each **2.50**
" " 3 " " not Adjustable " **1.50**
" Extra Long Points, 5 inches..per set **.35**
Adjustable trammel points sent unless otherwise ordered.

STARRETT'S TOOLS

No. 67 IMPROVED SCRIBERS

Fig. 24251A

All parts are interchangeable. The knurled sleeve is nickeled.

Price, Complete	each	.50
" without Long Point	"	.35
" Long Bent Point	"	.15
" Straight Point or Short Bent Point	"	.10

Sent complete unless otherwise ordered.

No. 68 ADJUSTABLE SLEEVE SCRIBERS

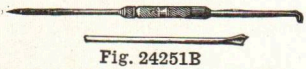


Fig. 24251B

Made in two lengths, 8 and 12 inches. Tool makers will find the small size more desirable for general use, and the larger one for heavier work. For pattern makers a knife scriber, made of a fine grade of steel, is supplied as an auxiliary.

Price, without Knife Point	each	.50
" Knife Point	"	.15
" Scriber Point	"	.15

The 8-inch, without knife point, sent unless otherwise ordered.

No. 70 POCKET SCRIBERS

Fig. 24251C

Reversible, telescoping into the stock, and is held by a slight turn of chuck.

Number		70A	70B
Diameter Handle	inches	1/4	3/8
Length of Blade	"	2 3/8	2 7/8
Price	each	.25	.35

No. 162 PIN VISES

Fig. 24251D

The hole extends through full length of the handle. Nickel-plated.

No.	Capacity Inches	Price Each
162A	0 to .040	.55
162B	.030 " .062	.55
162C	.050 " 125	.55
162D	.115 " 187	.75

Price, Complete, One of Each..... 2.40

No. 29 SCRATCH GAUGES

Fig. 24251E

Graduation in 50ths or 64ths.

Size Inches	Beam Inches	Price, Each Plain	Price, Each Graduated
5	15/64	.65	1.00
6	5/16	.75	1.25

Sent graduated in 64ths unless otherwise specified.

No. 429 CARPENTERS' SCRATCH GAUGES

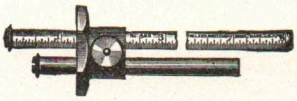


Fig. 24251F

Made from steel, octagon, casehardened. Two bars, 5/16-inch, one plain, 4 inches long and the other 8 inches, graduated in 32nds.

Price.....each 1.50

No. 66 LOCOMOTIVE GUIDE LINERS

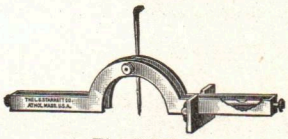


Fig. 24251G

For lining up the guides for the crossheads of locomotives.

Price.....each 3.50

No. 69 MEASURING BAR CLAMPS

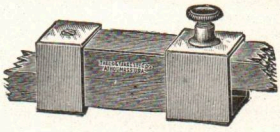


Fig. 24251H

These clamps are 1 inch square inside and are to be used with two wooden bars about 1 by 1/2 inch, of any desired length, nickel-plated.

Price.....per pair .75

STARRETT'S TOOLS

Nos. 190 AND 191 LITTLE GIANT JACK SCREWS

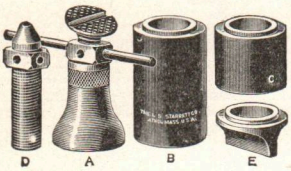


Fig. 24256A

Designed for tool room use, for leveling up work on a planer bed or under an upright drill, setting up machinery, etc.

DIMENSIONS

Number	190	191
Diam. at Base inches	1¼	1
Height inches	2¼ to 3⅝	1½ to 3½
" of Extension (B) "	2	1
" " " (C) "	1	½

PRICES

Number	190	191
Price, Jack (A) each	.75	.75
" Extension Base (B) "	.20	.20
" " " (C) "	.15	.15
" " " (E) "	.15	.15
" Extra Screw (D) "	.15	.15
" Complete "	1.40	1.40

Sent complete unless otherwise ordered.

No. 154 ADJUSTABLE PARALLELS

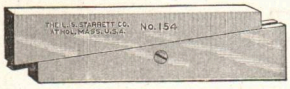


Fig. 24256B

They will be found convenient for use in connection with milling, planer and shaper vises, taking the place of a large number usually required, also for leveling up work on planer. They give any height from ⅜ to 2¼ inches.

No.	Length Inches	Thickness Inches	Capacity Inches	Price Each
154A	1¾	9/32	⅜– ½	.75
154B	2⅛	9/32	½– 11/16	.90
154C	2 11/16	9/32	11/16– 15/16	1.00
154D	3 9/16	9/32	15/16–1 5/16	1.25
154E	4 3/16	9/32	1 15/16–1¾	1.50
154F	5 1/16	9/32	1¾–2¼	1.75

No. 161 TOOLMAKERS' PARALLEL CLAMPS

Fig. 24256C

Made of steel, casehardened.

No.	Opening of Jaw, Inches	Length of Jaw, Inches	Price *per Pair
161AA	¾	1⅝	1.20
161A	1¼	2	1.40
161B	1¾	2½	1.70
161C	2¼	3	2.00
161D	2¾	4	2.20

*Two clamps.

No. 160 TOOLMAKERS' STEEL CLAMPS

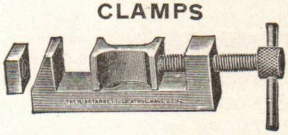


Fig. 24256D

Made from drop forgings, casehardened and have take-up blocks to slip on and off end of screw.

Size inches	1	2
Price *per pair	2.00	2.50

*Two clamps.

No. 268 DRILL BLOCKS AND CLAMPS

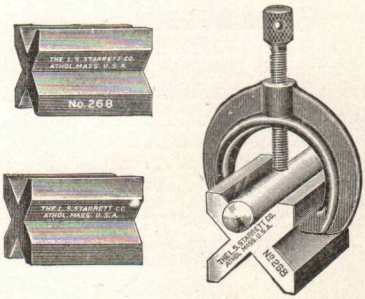


Fig. 24256E

Clamp holds a round piece up to 1⅛-inch diameter firmly in groove of blocks for prick punching, etc. Drill blocks furnished in pairs.

Price, No. 268A, Two Drill Blocks per pair	1.00
Price, No. 268B, Clamp each	.50
" " 268C, Set Complete per set	1.50

STARRETT'S TOOLS

Nos. 95 AND 96, ADJUSTABLE BENCH LEVELS

Fig. 5657A

These levers have a concaved groove the length of base, leaving a flat margin each side which improves its seat for flat work while forming an absolutely true and reliable seat for shafting, etc., and is better than a V groove.

No. 95 has plain vial. No. 96 has ground and graduated vial.

Length Inches	Price, Each No. 95	No. 96
4	1.00	2.50
6	1.25	3.50
8	1.50	4.00
*12	2.00	5.50
†18	3.00	8.00

*With plumb. †With double plumb.

Nos. 97 AND 98, IMPROVED LEVELS

Fig. 5657B

In addition to the regular parallel vial, the bases have a cross level which enables one to place or hold the base on a shaft level in its cross section.

No. 97 has plain vial, and No. 98 has ground and graduated vial.

Length Inches	Price, Each No. 97	No. 98
6	1.75	4.00
8	2.00	4.50
*12	2.50	6.00
†18	3.50	8.50

*With plumb. †With double plumb.

No. 130, IRON BENCH LEVELS

Fig. 5657C

Length ..... inches 3½
Price ..... each .50

No. 132, BENCH LEVELS

Fig. 5657D

With double plumbs, these levers have a concaved groove the length of base, leaving a flat margin each side which improves its seat for flat work while forming an absolutely true and reliable seat for shafting, etc., and is better than a V groove.

Length Inches	Price Each	Length Inches	Price Each
4	1.35	12	1.75
6	1.50	18	2.00
9	1.65	24	2.25

Nos. 197 AND 198, ELECTRICIANS' LEVELS

Fig. 5657E

The base is made of bronze, is non-magnetic and has concave groove in the bottom, running through the center full length, adapting it to rest on a shaft or pipe as well as on a flat surface.

No. 197 has plain vial; No. 198 has ground and graduated vial.

Size ..... inches	8	12	16
Price, No. 197 ... each	2.50	3.50	4.50
" " 198 ... "	4.50	6.00	8.00

In Fancy Wooden Case, extra 1.00

No. 135, POCKET LEVELS

Fig. 5657F

Nickel-plated.

Length ..... inches 2½ 3½
Price ..... each .40 .50

No. 131, LEVEL SIGHT ATTACHMENTS

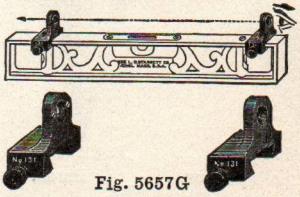


Fig. 5657G

Sighting through the holes will enable one to use the common level for leveling a plot of ground from a fixed point at long range. Made to fit 6, 9, 12, 18 and 24-inch sizes of No. 132 levels.

Price ..... per pair .75

STARRETT'S TOOLS

ENGINEERS' AND PLUMBERS' LEVELS, No. 133

Fig. 1862A

An adjustable, incline level, a fixed level and a plumb. The hinged tube inside the working faces of the frames, carrying a level glass, is adjustable to the graduated scale and shows any incline by 32nds (or less) to 2 inches to the foot without interfering in the least with the plumb or level.

Style of Glass..	Plain		Ground	
Length...inches	10	15	10	15
Price.....each	2.75	3.00	5.75	6.00

CROSS-TEST LEVELS No. 136

Fig. 1862B

Has two levels united in one frame, extending at right angles.

Price.....each .75

PLUMB BOBS

COMMON

Fig. 1862C

BRASS

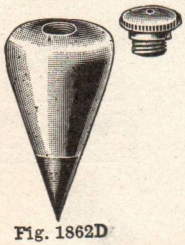


Fig. 1862D

Wt. Oz.	Price, per Doz. Common	Cast *Brass	Wt. Oz.	Price, per Doz. Common	Cast *Brass
6	....	7.25	16	....	11.40
9	1.35	....	18	2.70	.....
9½	1.45	....	42	5.80	.....
11½	....	10.00	..	....	.....

*Steel point.

IMPROVED PLUMB BOBS

No. 87

Fig. 1862E

No. 177

Fig. 1862F

The string can be fastened without a knot to tie or untie, simply by drawing it into the peculiarly slotted neck at the top, after unwinding the required length when the bob will hang perfectly true.

No. 87 is mercury filled. No. 177 is made from solid steel, the mercury being omitted.

Size, Inches Length	Diam.	Price, Each No. 87	No. 177
4	½	....	1.50
5	⅝	....	2.00
5½	⅞	....	2.50
6	1	....	3.00

On account of fluctuation in prices of mercury, prices on No. 87 Plumb Bobs will be quoted upon application.

ADJUSTABLE PLUMB BOBS

Fig. 1862G

Wt. Oz.	Price, per Dozen Iron	Bronze
6	11.04	.....
9	.....	18.00
9½	.....	21.00

STARRETT'S TOOLS

SCREW PITCH GAUGES

No. 40

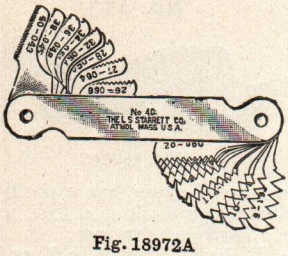


Fig. 18972A

The teeth are sharp and clean cut. Can be used inside of a nut as well as on outside of a screw or bolt, and are convenient and reliable to use as a 60-degree center gauge, and gauge to test the grinding of either an inside or outside threading tool.

Has 22 pitches as follows:

9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40.

Price.....each **1.00**

SCREW PITCH GAUGES

No. 4

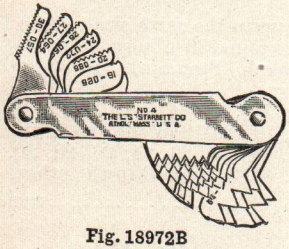


Fig. 18972B

Like No. 40, can be used inside of a nut as well as on the outside of a screw or bolt. It is also a reliable tool to use as a 60-degree center gauge and gauge to test the grinding of either an inside or outside threading tool.

Has the following pitches:

4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30.

Price.....each **1.25**

SCREW PITCH GAUGES

No. 155

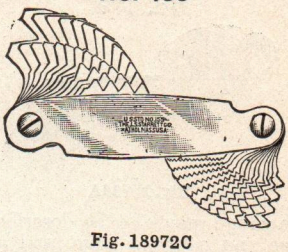


Fig. 18972C

U. S. standard. Also a center gauge with coarse and fine notch. Has 25 pitches as follows:

2¼, 2⅜, 2½, 2⅝, 2¾, 2⅞, 3, 3¼, 3½, 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, and 20.

Price.....each **1.50**

SCREW PITCH GAUGES

No. 7

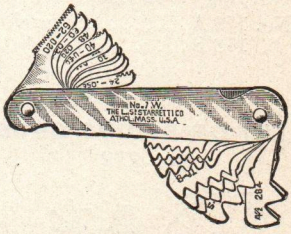


Fig. 18972D

For Whitworth Standard Threads. Has 26 pitches as follows:

4, 4½, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 40, 48 and 60.

Price.....each **1.25**

SCREW PITCH GAUGES, No. 5

Of the same form as No. 40 for inside and outside work, has 26 pitches as follows:

32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82.

Price.....each **1.25**

SCREW PITCH GAUGES, No. 6

Of the same form as No. 4. Has 30 pitches as follows:

4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40 and 42.

Price.....each **1.50**

STARRETT'S TOOLS

FILLET OR RADIUS GAUGES
No. 178

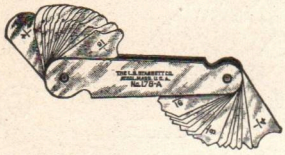


Fig. 18734A

This gauge may also be described as a concave and convex gauge, and is especially adapted for use in laying out special forming tools, dies, etc., as well as for measuring fillets.

No. 178A has 30 leaves stamped to indicate radii by 64ths, from $\frac{1}{32}$ to $\frac{1}{4}$ inch (one half diametric size). Diameters are from $\frac{1}{16}$ to $\frac{1}{2}$ inch, varying by 32nds.

No. 178B is made with 32 leaves stamped to indicate radii by 64ths, from $\frac{17}{64}$ to $\frac{1}{2}$ inch. Diameters are from $\frac{17}{32}$ to 1 inch, varying by 32nds.

Price, No. 178 A.....each **1.00**
" " 178 B..... " **1.50**

FILLET OR RADIUS GAUGES
No. 272

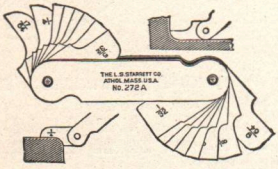


Fig. 18734B

Similar in design to No. 178 and affords means of obtaining the radii of fillets, corners, etc., as shown by the illustration.

Each blade is stamped with the radius in 64ths, the external being on one side and the internal on the other.

It can be used in any position or at any angle.

No 272A has 16 blades, with radii from $\frac{1}{32}$ to $\frac{17}{64}$ inch, varying by 64ths. No. 272B has 16 blades with radii from $\frac{9}{32}$ to $\frac{33}{64}$ inch, varying by 64ths.

Price, No. 272 A.....each **1.00**
" " 272 B..... " **1.50**

POSITIVE STOP THREAD GAUGES
No. 473

Fig. 18734C

This form of gauge has a positive stop which holds the blade in a fixed and convenient position for use. It has 30 pitches, V thread, from 6 to 60 as follows: Nos. 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, and 22 in one end of the case.

Nos. 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42, 48, 50, 56, and 60 in the other.

The number of pitch is stamped on the right side of each blade.

Price.....each **1.50**

POSITIVE STOP THREAD GAUGES
No. 476

Fig. 18734D

Put up in the same size case as No. 473 and contains 30 blades, Nos. 3½ to 60, Whitworth Standard, of 30 pitches as follows:

Nos. 3½, 4, 4½, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16 and 18 in one end of the case.

Nos. 19, 20, 22, 24, 26, 28, 30, 32, 36, 40, 44, 48, 50 and 60 in the other.

Price.....each **1.50**

No. 474

Similar to No. 473, but has finer pitches and will therefore meet the requirements of automobile and bicycle manufacturers.

Contains 30 blades with pitches as follows:

Nos. 26, 27, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, and 52 in one end of the case.

Nos. 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, and 82, in the other.

Price.....each **1.50**

STARRETT'S TOOLS

THICKNESS GAUGES
No. 72

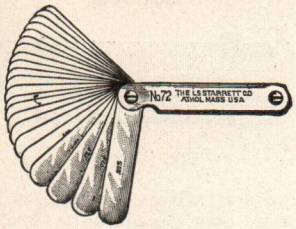


Fig. 5653A

Has 22 leaves varying in thickness from .004 to .025, varying by thousandths.

Price.....each **2.00**

THICKNESS GAUGES
No. 172

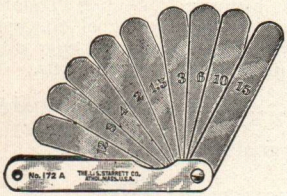


Fig. 5653B

No. 172B and 172C have 8 leaves, viz: .002, .003, .004, .006, .008, .010, .012, .015.

No. 172A has in addition one more leaf, .0015. No. 172A is standard set.

Number.....	172A	172B	172C
Size, Case.....inches	3⅜	4¾	6¼
" Leaves... "	3 1/16	4½	6
Price.....each	**1.25**	**2.00**	**2.50**

ENGINEERS, GAUGES
No. 245

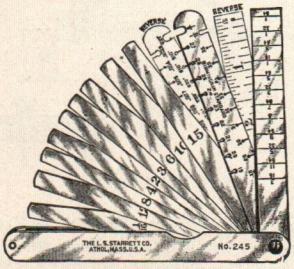


Fig. 5653C

In addition to those of No. 172B, No. 245 has one more leaf, 1/16-inch, a taper and English wire gauge.

Price.....each **4.00**

TAPER GAUGES
No. 267

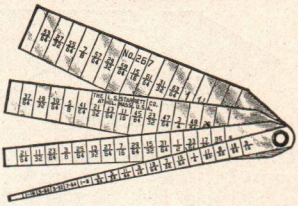


Fig. 5653D

The leaves are tapering, the width varying by 1/64 to every ¼-inch of their length. Graduated in ¼ inches, figured to read in fractions of an inch from 1/16 to 1 1/16 inch.

Price, plain.....each **4.00**
" nickel-plated..... " **5.00**

DEPTH GAUGES
No. 45

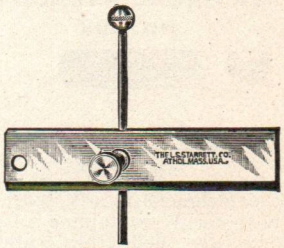


Fig. 5653E

The wire is held to a groove by a friction spring inside the nut while adjusting, and may be used close to the end, as well as the middle of the straight edge.

By loosening the nut, the gauge may be neatly folded.

Number.....	45A	45B	45C
Size, Stock.....inches	3½	6	10
Price.....each	**.75**	**1.15**	**1.35**

DEPTH GAUGES
No. 46

Has in place of the round wire to slide in the groove as shown in No. 45, a 4 or 6-inch scale, 3/16-inches wide, graduated in either 32nds and 64ths, 50ths and 100ths, or 64ths and 100ths.

No.	Stock In.	Scale In.	Price Each	No.	Stock In.	Scale In.	Price Each
46A	2½	4	**1.25**	46D	6	6	**1.75**
46B	3½	6	**1.50**	46E	10	6	**2.25**
46C	6	4	**1.50**	....	..	..	....

STARRETT'S TOOLS

CENTER GAUGES
No. 390

Fig. 18733A

For use in grinding and setting screw cutting tools. The angles are 60° except in No. 395 and 396, in which they are 55°.

No. 390, not tempered. Graduated one corner each in 32nds, 24ths, 20ths, and 14ths. No. 391 spring-tempered. No. 395 Whitworth, not tempered. No. 396 Whitworth, spring-tempered. No. 397 Metric, not tempered. No. 398 Metric, spring-tempered.

Price, Not Tempered.....each .25
" Spring-tempered..... " .35

CENTER GAUGE ATTACHMENTS
No. 392

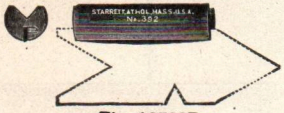


Fig. 18733B

This attachment is a V block with a slot above the V, containing a flat spring to frictionally hold the center gauge parallel with the block.

The attachment is adapted to hold the gauges either by the side or by the end for testing work.

Price.....each .50

KEY-SEAT CLAMPS
No. 298

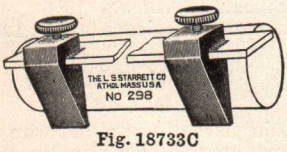


Fig. 18733C

Designed to transform any common steel scale into a key-seat rule. They can be put on or off almost instantly, and are a complete substitute for a more costly tool. They may be used with combination square blades, or with any straight rule, with accurate results.

Price.....per pair .60

KEY-SEAT RULES
No. 105

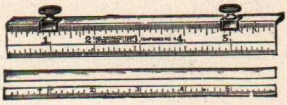


Fig. 18733D

The Starrett Key-seat Rule is an improvement over the ordinary type in that the machinists' scale is used as part of the key-seat rule. This is made possible by a device which holds two straight edges together in the form of a box square. One of these rules is a plain straight edge and the other the rule with which the machinist ordinarily works. The two edges forming the box square when applied to the surface of the cylindrical piece keep the graduated edge of the rule in a line parallel with the axis.

No. 105 B has auxiliary straight edge, plain. No. 105 C has auxiliary straight edge, graduated.

Size.....inches		6	9
Price, No. 105A	....each	2.25	3.00
" " 105B	.... "	2.75	3.75
" " 105C	.... "	3.00	4.25

If the style is not designated in an order, No. 105A will be sent.

RULE CLAMPS
No. 299

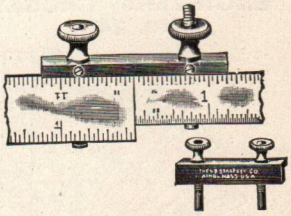


Fig. 18733E

Used to clamp two steel rules together, end to end, making one long rule. Rules may be of the same or different widths up to 1¼ inches. It is of special value to mechanics, whose tool chests will usually not hold rules longer than 12 inches.

Price.....each .50

STARRETTS' TOOLS

GAUGES

No. 185

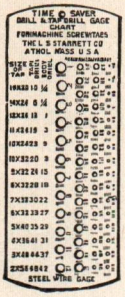


Fig. 5652A

No. 186

Fig. 5652B

No. 185

Timer saver, tap and drill gauge for drills up to No. 60.

Price.....each **2.00**

No. 186

Drill and steel wire gauge, for drills up to No. 60.

Price.....each **1.50**

No. 187

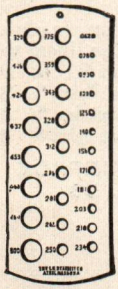


Fig. 5652C

No. 286

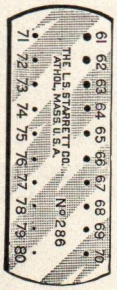


Fig. 5652D

No. 187

Jobbers' drill gauge, 1/16 to 1/2 inch by 64ths.

Price.....each **2.25**

No. 286

Twist drill and steel wire gauge, Nos. 61 to 80.

Price.....each **2.00**

The No. 286 gauge gives the number of drills to fit each hole. It can also be used in measuring fine drill rods. Each gauge is tested after hardening. Size of gauge 2 inches long, 3/4 inch wide and 1/16 inch thick.

WIRE GAUGES

No. 280

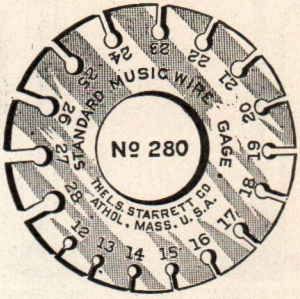


Fig. 5652E

Steel music wire gauge. Takes Nos. 12 to 28 W. & M. Standard.

Price.....each **1.50**

No. 287

W. & M. Standard Wire Gauge, takes Nos. 0 to 36.

Price.....each **2.50**

No. 281

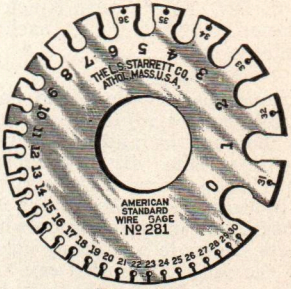


Fig. 5652F

American Standard Wire Gauge, takes Nos. 0 to 36.

Price.....each **2.50**

No. 282

American Standard Wire Gauge, takes Nos. 5 to 36.

Price.....each **2.00**

No. 188

English Standard Wire Gauge, takes Nos. 1 to 36.

Price.....each **2.50**

No. 189

English Standard Wire Gauge, takes Nos. 6 to 36.

Price.....each **2.00**

STARRETT'S TOOLS

SURFACE GAUGES

No. 52 No. 53

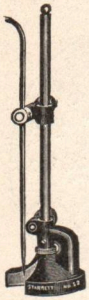


Fig. 5655A

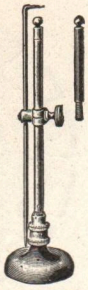


Fig. 5655B

No. 52

The sleeve and needle clasp, when loosened for adjustment, are both held by a slight spring friction, and by a single knurled nut both are rigidly clamped. For fine adjustment, the spindle in the base is raised or lowered by a knurled nut, and all backlash is taken up by a spiral spring in the base.

Price, No. 52A, 8-inch..... each **2.00**
" " 52B, 12 " ..... " **2.75**
" " 52C, 12 " with 6-inch Extension.....each **3.25**
Price, Sleeve only..... " **.75**

No. 53

This gauge has a turned and polished base, a micrometer adjusting nut reading to two thousandths, and a 6-inch extension for the spindle. By means of springs and taper fitting parts of the sleeve (not shown in illustration) the scriber is held by slight friction in any position while adjustments are made and firmly held by a turn of the nut. A knurled cam on the base releases and locks the spindle for adjusting.

Price, No. 53A, 8-inch..... .each **2.50**
" " 53B, 12 " ..... " **3.50**
" " 53C, 12 " with 6-inch Extension.....each **4.00**

ATTACHMENTS, No. 54

Fig. 5655C

To be used between the centers of the lathe to adjust, locate, and lay out work secured to the face-plate. An auxiliary arbor is supplied size of No. 53 Surface Gauge, 12-inch spindle, the sleeve fitting both spindle and arbor

Price, Auxiliary Arbor.....each **.50**
" Complete..... " **1.50**

UNIVERSAL SURFACE GAUGES

No. 57 No. 257

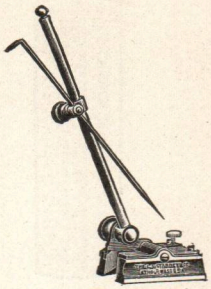


Fig. 5655D

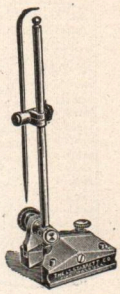


Fig. 5655E

No. 57

Has the latest improvements with heavy base, grooved through the bottom and end, adapting it for use on or against circular work as well as flat surfaces.

Price, No. 57A, 3-in., Base, 9-in., Spindle....ea. **2.50**
" " 57B, 3 " " 9 & 12-in., Spindle " **2.85**
" " 57C, 3¾ " " 12.in., Spindle... " **3.00**
" " 57D, 3¾ " " 12 & 18-in., Spindle " **3.50**

No. 257

There are four gauge pins in the base, frictionally held, which may be pushed to bear against the edge of a surface plate, or in the slot of a planer bed for lineal work.

Price, No. 257A, 3-in., Base, 9-in., Spindle...ea. **3.50**
" " 257B, 3 " " 9 & 12-in., Spind. " **3.85**
" " 257C, 3½ " " 12-in., Spindle.. " **4.00**
" " 257D, 3½ " " 12 & 18-in. Spind. " **4.50**

TOOLMAKER'S SURFACE GAUGES, No. 56

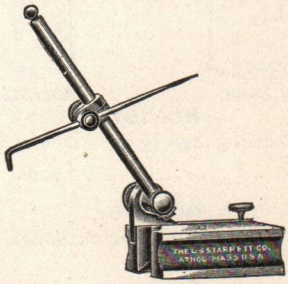


Fig. 5655F

Admirably adapted for light work. The base is steel, nicely finished and case-hardened with depressions milled in the sides for the thumb and finger to grasp.

Price, No. 56A, with Auxiliary Guide..each **3.00**
" " 56B, without Auxiliary Guide " **2.50**

STARRETT'S TOOLS

UNIVERSAL TEST INDICATORS No. 64

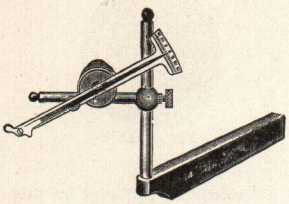


Fig. 5654A

May be used to test inside, outside or surface work. The special holder is designed to go in the tool-post of a lathe, adapting it for use to show the accuracy of all sorts of lathe work, turning, chucking or locating and centering work on face-plate.

The working parts of the head are hardened. In setting the indicator bring the contact point against the work so that the needle will point to 0, when any variation either way will show.

Price,	Indicator only.....each	2.50
"	" with Tool Post Holder and Arm complete...	3.50
"	Tool Post Holder, without Arm.....	.75
"	Tool Post Holder, with Arm.	1.00

CENTER TESTERS No. 65

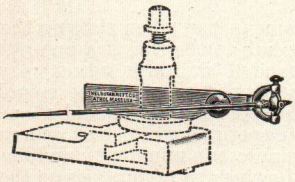


Fig. 5654B

This instrument is designed to use in adjusting and locating centrally any point or hole in a piece of work operated upon in a lathe chuck or on a face-plate; also to test the truth of lathe centers or a shaft between the centers.

Price.....each 2.50

UNIVERSAL DIAL TEST INDICATORS, No. 196

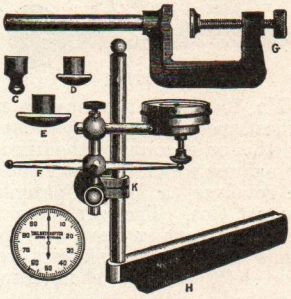


Fig. 5654C

Simple, reliable, easily read and very sensitive. Slight pressure upon contact point produces a movement of the hand on the dial. Circumference of dial divided into 100 equal spaces, each representing a movement of the contact point of one-thousandth of an inch.

One revolution of the hand therefore indicates one-tenth inch, the capacity of the instrument being two-tenths. By bringing the contact point against the work with just enough pressure to give the hand one full turn, then setting it at 0, an opportunity is given for one full revolution of the hand to both right and left of 0, showing a rise or drop in the work and the amount of variation.

A most valuable feature is the adjustable dial. By turning the knurled rim the dial may be instantly moved to bring the 0 mark to any point desired in relation to the hand.

Price,	Indicator with all Attachments.....each	10.75
"	Indicator Only, with Three Contact Points.....each	7.00
"	Hole or Button Attachment.....each	1.50
"	Tool Post..... "	.75
"	Clamp..... "	.75
"	Surface Gauge Sleeve.. "	.75
"	Extra Contact Points.. "	.10

Sent complete unless otherwise ordered.

STARRETT'S SPEED INDICATORS

HIGH SPEED INDICATORS No. 104

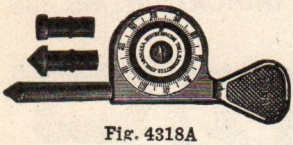


Fig. 4318A

The No. 104 Indicator may be run at the highest speed required without heating and this on account of the frictionless bearing against which the inner end of the spindle revolves (a feature patented by the Starrett Co). The working parts of this instrument are encased, and the dial plate has two rows of figures reading right or left, as the shaft may run. Nickel-plated.

Price, in Pasteboard Box....each **1.00**
" " Leather Case..... " **1.50**

IMPROVED SPEED INDICATORS No. 106

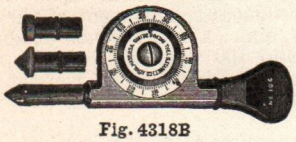


Fig. 4318B

No. 106 is a nicely made and finely working indicator. The working parts are inclosed like a watch and as well made. The graduations show every revolution, and with two rows of figures reading right and left, as the shaft may run. Every indicator is warranted first-class.

Price, in Pasteboard Box....each **1.50**
" " Leather Case..... " **2.00**

REGISTERING SPEED INDICATORS, No. 107

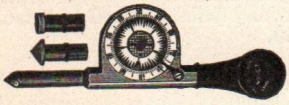


Fig. 4318C

The No. 107 Instrument was devised to automatically register hundreds as well as units and tens, and thus relieve the mind from keeping tally; also to furnish a better registering indicator at a more reasonable cost than has been on the market before.

Price, in Pasteboard Box....each **3.00**
" " Leather Case..... " **3.50**

SURFACE SPEED ATTACHMENT FOR SPEED INDICATORS

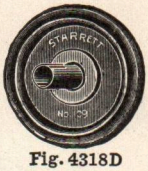


Fig. 4318D

This attachment applied to one of the speed indicators is designed to show the number of lineal feet per minute the periphery of a shaft or pulley is running and thus enable a workman to know if the speed is too fast or too slow to get the most work the tool will stand. For instance, the speed of a cone pulley being turned, needs to be changed at every step. Heretofore it has been all guesswork as to the number of feet per minute the periphery of the work is traveling. It may be so fast as to heat and spoil the tool, or it may not be nearly fast enough to perform what should be done.

ATTACHMENT APPLIED

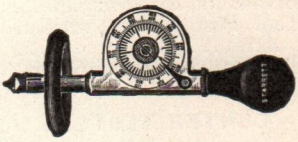


Fig. 4318E

The same is true when shifting the tool from the hub to the rim of a pulley. The rubber-banded indicator wheel may be instantly slipped off or on the spindle of any of the speed indicators, and when held against the periphery of a shaft or a pulley a half minute or a minute, by dividing the figures showing the revolutions on the dial of the indicator by 2, the number of feet the surface of the thing is traveling is obtained as each revolution of the indicator wheel shows six inches; twice around, one foot. A close approach to accuracy is not claimed for this attachment, but it will be found very convenient and adequate for the purposes intended, as suggested above.

Price.....each .50

SAND PAPER, EMERY CLOTH, ETC.

FLINT PAPER
IN SHEETS 9X11 INCHES

No.	Price per Ream	No.	Price per Ream
000 to 0	7.50	2½	13.95
½	7.95	3	15.90
1	9.00	3½	17.85
1½	10.50	4	20.40
2	12.15	Asstd	10.50

Packed in bundles for shipment as follows:

No....	000	00	0	½	1	1½	2
Reams.	5	5	5	4	3½	3	2½
No....	2½	3		3½	4	Asstd.	
Reams.	2	1½		1½	1	2½	

480 sheets to ream. Smallest package, ½ ream.

EMERY CLOTH
IN SHEETS 9X11 INCHES

No.	Price per Ream	No.	Price per Ream
000 to 100	30.00	2½	39.40
½	31.20	3	42.50
1	32.75	3½	46.00
1½	34.30	Asstd.	33.25
2	36.50	...	.....

CROCUS CLOTH

Price.....per ream **30.00**

Packed in bundles for shipment as follows:

Number	Cro.	000	00	0	100	½ 1
Grains.	....	F	150	120	100	90 80
Reams.	2	2½	2½	2½	2	2 1¾
Number	1½	2	2½	3	3½	Asstd.
Grains.	70	60	46	36	24	....
Reams.	1½	1¼	1	¾	¾	2

480 sheets to ream, in quires. Smallest package, ¼ ream.

ABRASITE CLOTH
IN SHEETS 9X11 INCHES

No.	Price per Ream	No.	Price per Ream
000 to 100	30.00	2½	39.40
½	31.20	3	42.50
1	32.75	3½	46.00
1½	34.30	Asstd.	33.25
2	36.50	...	.....

EXTRA FLINT PAPER
EXTRA COATED, IN ROLLS OF 50 YARDS

Width In.	Price, per Roll 000 to 0	½	1	1½	2	2½
2½	1.25	1.30	1.45	1.55	1.70	1.85
3	1.45	1.50	1.65	1.85	2.00	2.15
4	1.80	1.90	2.10	2.35	2.55	2.80
6	2.60	2.70	3.05	3.35	3.70	4.00
8	3.35	3.50	3.95	4.35	4.85	5.25
9	3.70	3.90	4.40	4.90	5.40	5.85
10	4.10	4.35	4.85	5.40	5.95	6.50
12	4.85	5.15	5.75	6.90	7.10	7.75
15	6.00	6.35	7.15	7.95	8.80	9.60
18	7.10	7.55	8.50	9.45	10.45	11.40
20	7.90	8.35	9.40	10.45	11.60	12.65
24	8.60	9.10	10.30	11.50	12.80	14.00

EMERY CLOTH
IN EXTRA COATED 50-YARD ROLLS

Width In.	Price, per Roll 000 to 100	½	1	1½	2	2½
3	4.10	4.30	4.55	4.90	5.10	5.50
3½	4.75	4.95	5.25	5.65	6.00	6.50
4	5.35	5.65	6.00	6.40	6.80	7.35
5	6.65	7.00	7.40	7.95	8.45	9.15
6	7.90	8.30	8.85	9.45	10.10	10.90
7	9.15	9.65	10.25	11.00	11.70	12.65
8	10.40	10.90	11.65	12.50	13.35	14.40
9	11.65	12.25	13.05	14.00	14.95	16.15
10	12.95	13.60	14.50	15.55	16.60	17.95
12	15.45	16.20	17.30	18.60	19.85	21.45
14	18.00	18.90	20.20	21.65	23.10	25.00
15	19.25	20.30	21.60	23.20	24.75	26.75
16	20.55	21.60	23.00	24.70	26.40	28.50
18	23.05	24.25	25.85	27.75	29.65	32.05
20	25.60	26.90	28.70	30.80	32.40	35.60
24	30.60	32.20	34.35	36.90	39.40	42.60
27	32.15	33.85	36.10	38.80	41.50	44.90

ABRASITE CLOTH
IN EXTRA COATED 50-YARD ROLLS

Width In.	Price, per Roll 000 to 100	½	1	1½	2	2½
3	4.10	4.30	4.55	4.90	5.10	5.50
3½	4.75	4.95	5.25	5.65	6.00	6.50
4	5.35	5.65	6.00	6.40	6.80	7.35
5	6.65	7.00	7.40	7.95	8.45	9.15
6	7.20	8.30	8.85	9.45	10.10	10.90
7	9.15	9.65	10.25	11.00	11.70	12.65
8	10.40	10.90	11.65	12.50	13.35	14.40
9	11.65	12.25	13.05	14.00	14.95	16.15
10	12.95	13.60	14.50	15.55	16.60	17.95
12	15.45	16.20	17.30	18.60	19.85	21.45
14	18.00	18.90	20.20	21.65	23.10	25.00
15	19.25	20.30	21.60	23.20	24.75	26.75
16	20.55	21.60	23.00	24.70	26.40	28.50
18	23.05	24.25	25.85	27.75	29.65	32.05
20	25.60	26.90	28.70	30.80	32.90	35.60
24	30.60	32.20	34.35	36.90	39.40	42.60
27	32.15	33.85	36.10	38.80	41.50	44.90

INDIA OILSTONES

Every requirement of edge tool users is met with this line of stones.

India Oilstones are made of Alundum—a hard, sharp, quick-cutting electric furnace product of great purity.

They are made in three grades or grits—coarse, medium, and fine—and in all required shapes for regular and special work.

Coarse stones are indispensable in machine shops for sharpening very dull or nicked tools, machine knives and for general use where fast cutting is desired.

Medium stones are used for sharpening mechanics' tools in general, more particularly those used by carpenters and woodworking establishments. The medium grit gives a medium fine edge, cuts with great rapidity, never glazes, and wears uniformly.

Fine stones are adapted for engravers, die workers, cabinetmakers and all users of tools requiring a very fine, keen edge.

India stones may be used with a high degree of satisfaction on all classes of work.

All India Stones are oil filled by a patented process, a feature which insures a moist, oily sharpening surface, with the use of only a small quantity of oil. It also insures a good cutting surface.

SPECIAL SHAPES FOR SPECIAL PURPOSES

For chisels, plane bits, planer knives, scrapers, paper cutting knives, and all tools with broad flat edges: Nos. 0, 1, 1½, 2, 3, 24 and 29.

For reamers, dies, silversmiths', watch, clock and instrument makers' tools, and shoe machine tools, such as barber undertrimmers, welt awls, etc.: Nos. 4, 5, 5½, 6, 7, 8, 8½, 9 and 57.

For reamers: Nos. 23, 25, 56 and 56½.

For molder knives, bead planers, channel knives, gouges, auger bits, instrument makers' tools, and all curved cutting edges: Nos. 10, 11, 12, 13, 14, 15, 16, 20, 22, 22½, 41, 51 and 58.

For all engravers' tools, and for marking metals: No. 19 Engravers' Pencil.

For fine mold and die work, silversmiths', watch, clock and fine instrument makers' tools: Nos. 4, 5, 5½, 6, 7, 8, 9, 26, 27, 28, 43, 44, 45, 46, 47, 48, 49, 50, 51, 57 and 58.

For wood and ivory carvers' tools: Nos. 36, 37, 38 and 39.

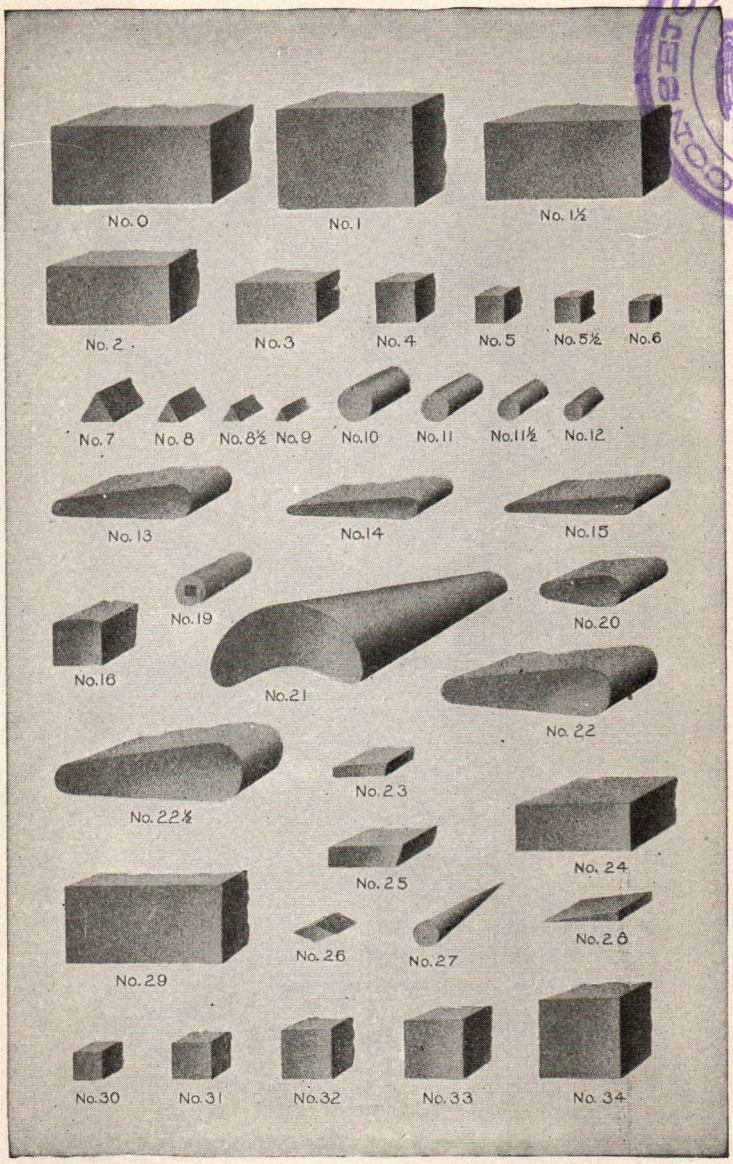
Certain shapes are found particularly valuable in machine shops. For reamers, No. 25; for taps, Nos. 13, 14 and 15. For dies, Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12, 26 and all small India shapes.

Practically every shape can be used to advantage in the tool room. For ordinary scraping tools, Nos. 0, 1 and 1½. Fine grits are used for frosting or fancy scraping.

Special shapes found valuable in shoe shops are Nos. 0, 1, 1½, 2, 3, 7, 8, 9, 14, 15, 16, 19, 23, 24, 25, 26, 27, 29, 41 and 52.

PIKE INDIA OIL STONES

Nos. 0 TO 34

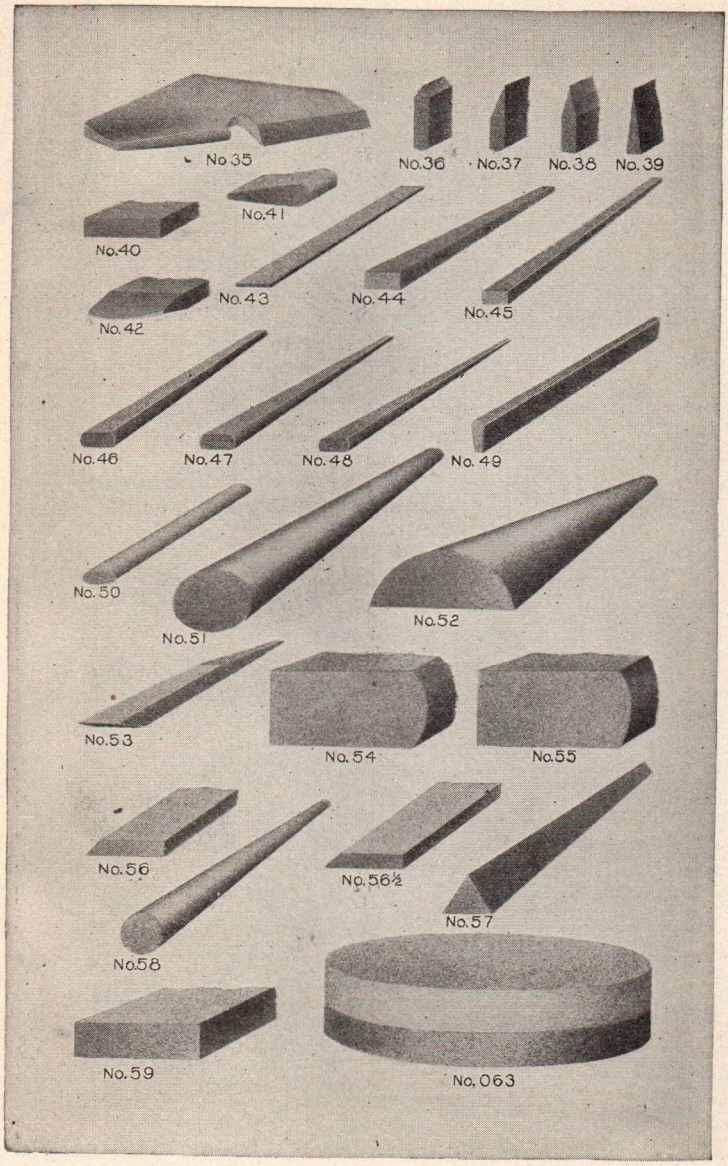


GOBIERNO DE MINERIA

For prices, see second succeeding page.

PIKE INDIA OIL STONES

Nos. 35 TO 063



For prices, see succeeding page.

PIKE INDIA OIL STONES

PRICE LIST—COARSE, MEDIUM OR FINE GRITS

EFFECTIVE OCTOBER 10, 1919

Shape	Dimensions Inches	Price Each
0	8x2x1	1.75
0	8x2x1 Combination	2.25
1	8x1¾x1¼	2.00
1	8x1¾x1¼ Combination	2.50
1½	7x2x1	1.50
1½	7x2x1 Combination	2.00
2	6x1⅝x¾	1.00
2	6x1⅝x¾ Combination	1.35
3	6x1x½	.60
3	4x1x½ Combination	.85
4	Square File 4x½	.50
5	" " 4x⅜	.50
5½	" " 4x5/16	.50
6	" " 4x¼	.50
7	Triangular " 4x½	.65
8	" " 4x⅜	.65
9½	" " 4x5/16	.65
9	" " 4x¼	.65
10	Round " 4x½	.70
11	" " 4x⅜	.70
11½	" " 4x5/16	.70
12	" " 4x¼	.70
13	4½x1¾x½x3/16	.75
14	4½x1¾x⅜x⅛	.75
15	4½x1¾x¼x1/16	.75
16	8x⅝x⅝	1.10
19	Engravers' Pencils—Fine One End, Medium the Other	.65
20	4x1x7/16x3/16	.65
*21	8x2x1x⅜x3/16	1.50
22	4½x2⅛x⅝x5/16	1.00
22½	6x2¼x¾x⅜	1.25
23	3½x¾x3/16x⅛	.50
24	4½x1½x⅝	.75
24	4½x1½x⅝ Combination	1.00
25	4½x1x5/16 (Reamer Stone)	.50
26	4x9/16x3/16	.90
27	3x5/16 Points	.90
28	4x1x⅛	.70
29	6x2x1	1.25
29	6x2x1 Combination	1.75
30	Square File 6x⅜	.70
31	" " 6x½	.70
32	" " 6x⅝	.70
33	" " 6x¾	.80

Shape	Dimensions Inches	Price Each
34	Square File 6x1x1	.80
35	Bath Universal Slip	2.50
36	1 Set (4) Carvers Slips 2¼x⅞x3/16	2.00
37		
38		
39		
40	2x1x¼	.40
41	5x1x5/16x3/32	.70
42	4x1x¼	.65
43	4x½x¼	.85
44	4x½x¼x5/16x⅛	.85
45	4x5/16x3/16x5/16x1/16	.85
46	4x½x¼x5/16x⅛	.85
47	4x½x3/16x3/16x1/16	.85
48	4x⅜x3/16x⅛x1/16	.85
49	4x7/16x3/16x⅛	.85
50	3½x7/16x3/16	.85
51	Oval Plug 6x⅞x5/16	1.10
†52	Heel Breasting Stone 6x2x⅜	.70
53	Automobile Stone	.65
	Automobile Stone in Case	.80
54	8x2x¾ (High Round)	1.50
54½	5x1½x½ (" ")	1.00
55	4x1½x½ (" ")	.90
56	5x1x3/16 (Reamer Stone)	.55
56½	6x1x¼ (" ")	.85
57	4x½x¼	.85
58	4x½x¼	.85
59	3x1½x½ (Axe Stone) Coarse Grit Only	.50
60	Circular Axe Stone, 3x⅝	.75
61	3½x1x⅜	.25
62	Sportsman's Stone, 3x1⅜x½	1.10
63	Circular Comb. 4x1	2.00
	Circular Comb. in Steel Box	3.00
64	Triangular File 6x½	.85
65	" " 6x⅝	.95
66	" " 6x¾	.95
67	" " 6x1	1.10
	Engraver's Chuck	1.00
	Points, 1x⅛ in., per doz.	1.25
68	4½x¾x5/16	.50
	Wood Boxes, Each List	.60
	Iron " " "	1.25
....	.....	....

*Made in special fine only. †Made in medium fine only.

PIKE INDIA OIL STONES

MOUNTED

IN WOOD CASE

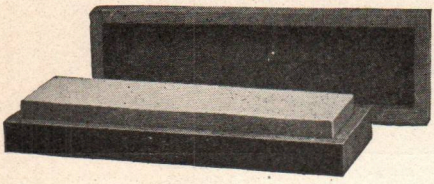


Fig. 8322A

IN IRON BOX

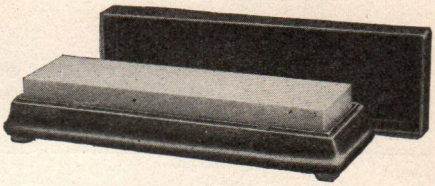


Fig. 8322B

Shape	Dimensions Inches	In Wood Cases: Approx. Wt. per Dozen Complete, Lbs.	In Wood Cases: Price, Coarse Medium or Fine, Each	In Iron Boxes: Approx. Wt. per Dozen Complete, Lbs.	In Iron Boxes: Price, Coarse Medium or Fine, Each
0	8x2x1	25	**1.60**	58	**2.00**
1	8x1¾x1¼	25	**1.60**	..	....
1½	7x2x1	20	**1.35**	50	**1.75**
2	6x1⅝x¾	11¼	**.95**	36	**1.35**
3	4x1x½	3½	**.70**	..	....
29	6x2x1	15	**1.10**	40	**1.50**

The above prices include cases or boxes.

The iron boxes are fitted with four cork feet which will, to a great extent, prevent them from sliding on bench while in use. The stones rest on a piece of felt in bottom of box, which, absorbing a quantity of oil, keep the stones moist. Polished wood cases, 35 cents each; finished iron boxes, 75 cents each.

COMBINATION STONES

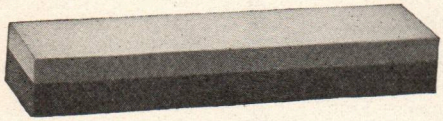


Fig. 8322C

Made with one side coarse and the other fine. The convenience of having two stones in one—that is, a coarse side for fast work, and a fine side for setting a fine, smooth edge—makes these combination stones valuable for carpenters, mechanics and all tradesmen who use edge tools.

The India combination stone has met with remarkable success for sharpening dull planer knives, paper cutting knives, cornering knives and shears.

Shape	Dimensions Inches	Price in Paper Boxes Each	Price, Mounted, Each: In Wood Boxes	Price, Mounted, Each: In Iron Boxes
0	8x2x1	**1.50**	**1.85**	**2.25**
1	8x1¾x1¼	**1.50**	**1.85**	....
1½	7x2x1	**1.25**	**1.60**	**2.00**
2	6x1⅝x¾	**.75**	**1.10**	**1.50**
24	4½x1½x⅝	**.60**	....	....
29	6x2x1	**1.00**	**1.35**	**1.75**
3	4x1x½	**.45**	**.80**	....

GRINDSTONES

UNMOUNTED

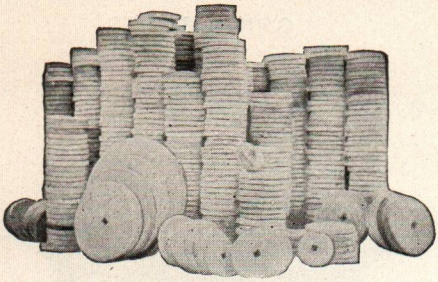


Fig. 13925A

We are prepared to furnish grindstones in any quantities and of suitable grits for every variety of grinding. Our facilities are as complete as money and experience can provide and the most painstaking care is exercised throughout our supply department. Consumers will find the quality and finish of our products unapproached by any other manufacturer, and the goods are cleaner and more attractive, our stock being kept under cover and protected from the weather. All our loose stones are made with parallel sides, will pile flat and firm and are not liable to breakage when stacked or stored.

STERLING

Fig. 13925C

Altogether the most substantial and lightest running grindstone made. Mounted with genuine Berea or Lake Huron stone, 19 to 22 inches in diameter, 1¾ to 2¼ inches thick. Weight, 50 to 60 pounds. Weight, crated complete, about 100 pounds. The frame can be set up in less time and with less labor than any other grindstone merely by manipulating one bolt. Ball-bearing double treadle.

Prices upon application.

SAMSON

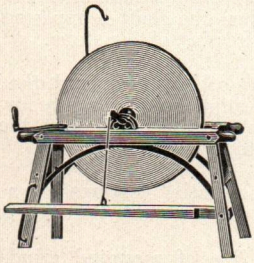


Fig. 13925 B

No.	Weight of Stone Inches	Diam. of Stone Inches	Thickness of Stone Inches	Price Each
1	100 to 110	27 to 29	1¾ to 2¼	**6.00**
2	70 " 80	24 " 26	1¾ " 2¼	**5.00**

FAMILY GRINDSTONE

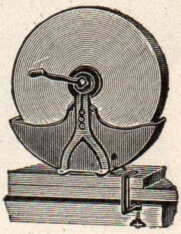


Fig. 13925D

Diam. Inches	Price Each	Diam. Inches	Price Each
6	**12.00**	10	**18.00**
7	**13.00**	11	**20.00**
8	**14.00**	12	**22.00**
9	**16.00**	..	.....

IRON GRINDSTONE FRAMES AND GRINDSTONES

IRON GRINDSTONE FRAMES

No. 155

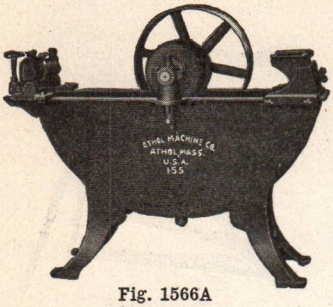


Fig. 1566A

No. 155 has adjustable tool rest, and truing attachment, boxes babbitt-lined. Pulley, 20-inch diameter, 5-inch face. Takes stone 42-inch diameter, 6-inch face.

Price, Complete without Stone.each **50.00**

No. 157

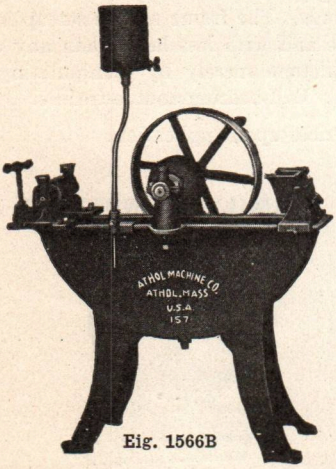


Fig. 1566B

No. 157 has adjustable tool rest, truing attachment and waterpot.

Takes stone 30-inch diameter and 4-inch face.

Boxes babbitt-lined.

Price, Complete.....each **18.00**
" without Waterpot..... " **17.00**

Price for above with stone quoted upon request.

KEYSTONE IRON FRAME POWER GRINDSTONES

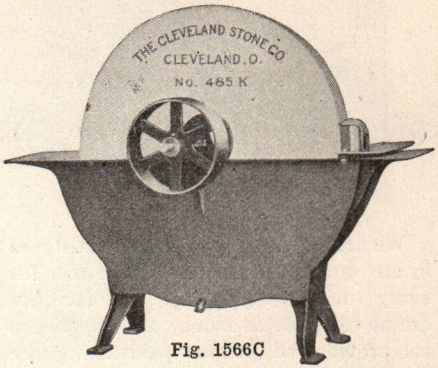


Fig. 1566C

The trough is a thick and heavy casting. It is cast in one piece, making it water-tight, avoiding all joints which invariably work loose and leak. The legs are cast separate and are securely fastened in place with two wrought iron bolts. An adjustable tool rest with drip pan is furnished with each frame.

Fitted with patent detachable fixture, which allows the frame and stone to be shipped separately and have the stone run true when the shaft is replaced, without any redressing of the stone.

Unless otherwise ordered, the Keystone will be shipped set up ready for use, with substantial skids bolted to the legs, to facilitate handling.

The essential features of a mounted grindstone is a stone that will grind.

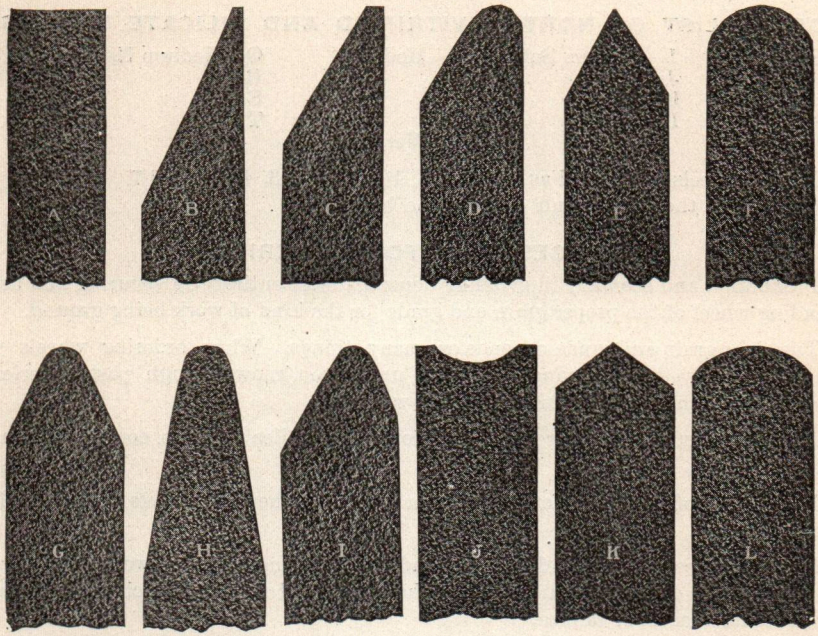
The line of mounted grindstones includes a variety of models, all constructed of good material and with a view of satisfying a demand for the style of frame the buyer may fancy.

A 12-inch diameter, 4-inch face pulley is furnished with all sizes of Keystone frames.

Prices upon application.

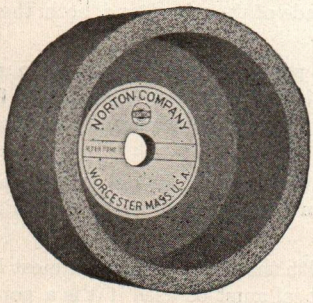
NORTON GRINDING WHEELS

SHAPES OF WHEEL FACES

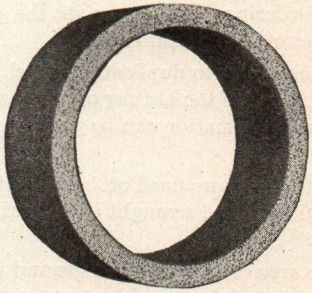


The above illustrations show different shapes of wheel faces. In ordering, give the letter on the illustration to show what face is required. If special shapes are required a diagram should accompany the order. All wheels furnished with square face, unless otherwise ordered.

CUP



CYLINDER



It is necessary, in ordering cylinders, that we know the diameter, height, and thickness of rim.

Straight cup and cylinder wheels sold from the Standard Grinding Wheel Lists which will be found on another page.

NORTON GRINDING WHEELS

ALUNDUM-CRYSTOLON

GRADE LIST OF NORTON VITRIFIED AND SILICATE WHEELS

E—Soft	I—Medium Soft	M—Medium	Q—Medium Hard	U—Hard
F	J	N	R	V
G	K	O	S	W
H	L	P	T	X

Y and Z—Very Hard

Elastic wheels are graded as follows: 1, 1½, 2, 2½, 3, 4, 5, 6 and 7. Grade 1 is the softest and grade 7 the hardest.

SUGGESTIONS FOR ORDERING

Production and economy in grinding depend almost entirely on securing and using a grinding wheel of the proper grain and grade for the kind of work being ground.

The right grain and grade depends on many things. When ordering wheels you should always give the following conditions, unless you know through past experience the exact grain and grade required for your work:

Kind of material—whether iron cast, wrought or malleable brass, composition, hard steel or soft steel.

Description of article—whether heavy or light; whether the wheels contact will be broad or narrow.

Speed of wheel spindle, and if it is cylindrical grinding, speed of work. Slight differences in speed cause wide difference in the working of wheels. A change of speed may cause its success or failure.

State whether wet or dry grinding.

Do not fail to give the diameter of wheel, thickness and size of hole, and if special faces, state the kind of face. If you have been using one that is perfectly satisfactory specify grain and grade, also the order number of the last one used.

The tag which comes with the wheel should always be preserved and referred to when reordering. This tag gives the grain and grade of the wheel and both the customer's and our order numbers.

If you desire to duplicate a wheel, it is a good policy to either refer to our order number, send us the old tag or give us all the particulars stated on the tag. If for any reason, no information can be given but our order number, we can readily duplicate the wheel.

Soft wheels are used on hard materials like hardened steel; on softer materials, like mild steel and wrought iron, harder grades can be used, the grains not dulling so quickly.

The area of surface to be ground in contact with the wheel is of the utmost importance in determining grade. A strongly bonded wheel must be used if it is a point contact—like grinding a ball. If we have a broad contact where the work brings a large part of the wheel into operation, softer grades must be used.

Vibration in grinding machines necessitates the use of harder wheels. A softer grade of wheel can be used more efficiently on rigid machines.

NORTON GRINDING WHEELS

ALUNDUM-CRYSTOLON

TABLE FOR SELECTION OF GRADES

Class of Work	Alundum		Crystolon	
	Grain	Grade	Grain	Grade
Aluminum Castings	36 to 46	3 to 5 Elas.	20 to 24	O to Q
Brass or Bronze Castings (Large)	.....	.....	20 " 24	Q " R
" " " " (Small)	.....	.....	24 " 36	O " Q
Brick, Fire	.....	.....	16 " 20	O " Q
" Pressed	.....	.....	16 " 20	O " P
Car Wheels, Cast Iron	.....	.....	16 " 24	P " R
" " Chilled	16	Q	16 " 24	O " S
Cast Iron, Cylindrical	.....	.....	30 " 46	J " L
" " Surfacing	.....	.....	30 " 36	J " K
" " (Small) Castings	.....	.....	20 " 30	P " S
" " (Large) "	.....	.....	16 " 24	R " U
Chilled Iron Castings	.....	.....	16 " 24	Q " U
Dies, Chilled Iron	.....	.....	20 " 30	Q " U
" Steel	36 to 60	J to L	.....	.....
Drop Forgings	20 " 30	P " R	.....	.....
Hammers, Cast Steel	30 " 36	P " Q	.....	.....
Hollow Ware, Inside Grinding	.....	.....	30	Q
" " Thin Edges	.....	.....	24	U
Internal Grinding of Automobile Cylinders (Cast Iron)	.....	.....	30 to 36	H to K
Aeroplane Cylinders (Steel) Internal	30 to 46	H to J	.....	.....
Internal Grinding, Hardened Steel	3836 " 3860	I " K	.....	.....
Knives (Paper), Automatic Grinding	2630 " 2646	J " K	.....	.....
" (Planer), " "	2630 " 2646	J " K	.....	.....
" Leather Shaving	60	N " O	.....	.....
" " Splitting	24 to 30	1 to 2 Elas.	.....	.....
" Molding Bit, etc.	2646 " 2660	3 Elas.	.....	.....
	2636 " 2660	L to M	.....	.....
" (Planing Mill), Hand Grinding	2646 " 2660	J " M	.....	.....
" Shear and Shear Blades	2630 " 2660	J " M	.....	.....
" Shoe	2660	4 to 6 Elas.	.....	.....
Lathe Centers	46 to 120	J to M	.....	.....
Lathe and Planer Tools	20 " 24	P Sil.	.....	.....
	20 " 36	O to P	.....	.....
Machine Shop Use, General	24 " 36	O " Q	.....	.....
Malleable Iron Castings (Large) Annnealed	14 " 20	R " U	.....	.....
" " " (Small) "	20 " 30	Q " S	.....	.....
" " " (Large) Unannealed	.....	.....	16 to 24	R to U
" " " (Small) "	.....	.....	16 " 24	Q " S
Marble, Finishing	200XF	I to J	.....	.....
" Roughing	.....	.....	6	O to P
" Coping	.....	.....	14 to 20	5 to 7 Elas.
" Molding	.....	.....	36 " 46	J to M
Milling Cutters, Automatic or Semi-automatic Grinding	46 to 60	I to M	.....	.....
Milling Cutters, Hand Grinding	46 " 60	J " M	.....	.....

NORTON GRINDING WHEELS

ALUNDUM-CRYSTOLON

TABLE FOR SELECTION OF GRADES—CONTINUED

Class of Work	Alundum		Crystolon	
	Grain	Grade	Grain	Grade
Nickel Castings	20 to 24	P to Q	20 to 24	R
Pearl Grinding, Roughing	.....	.....	30 " 50	P to U
" " Finishing	.....	.....	100 " 150	M " P
Plow Bodies (Cast Iron), Surfacing	.....	.....	24	R
Plows (Steel), Jointing	20 to 24	R to S	.....	.....
Plow Points (Chilled Iron), Surfacing	.....	.....	20 to 30	O to S
Plows (Steel), Surfacing	16 to 24	Q to S	.....	.....
Porcelain, Roughing	.....	.....	36 to 50	O to R
Pulleys (Cast Iron), Surfacing Faces of	.....	.....	30 " 36	K " L
Radiators (Cast Iron), Edges of	.....	.....	24 " 30	R " S
Razors, Grinding and Concaving	46 to 120	H to O	.....	.....
Reamers, Taps, Milling Cutters, etc., Hand Grinding	46 " 60	K " O	.....	.....
" " " " " Special Machines	46 " 60	J " M	.....	.....
Rolls (Cast Iron), Wet	.....	.....	24 to 36	J to L
" (Chilled Iron), Finishing	70 to 80	1½ to 2 Elas.	70 " 80	1½ to 2 Elas.
" " " Roughing	.....	.....	30 to 46	K to M
Rubber	30 to 50	J to K	30 " 50	K " M
Sadirons, Finishing	.....	.....	80 " 120	Q " R
" Roughing	.....	.....	20 " 30	Q " S
Saws, Gumming and Sharpening	2636–2650 30 to 36	M to N 3 to 4 Elas.	.....	.....
" Cold Cutting-off	46 " 60	O to Q	.....	.....
Shovels, Edging	24 " 36	Q " S	.....	.....
Spiral Springs, Ends of	16 " 20	Q " R	.....	.....
Steel (Soft), Cylindrical Grinding	24 Comb. 46 to 60	L " N L " N	.....	.....
" " Surface "	24 " 36	H " K	.....	.....
" (Hardened), Cylindrical Grinding	24 Comb. 46 to 60	J to K J " K	.....	.....
" " Surface "	16 " 46	H " K	.....	.....
Steel, Large Castings	10 " 20	Q " W	.....	.....
" Small "	20 " 30	P " R	.....	.....
" (Manganese), Safe Work	16 " 46	L " P	.....	.....
" " Frogs and Switches	14 " 20	O " R	.....	.....
Structural Steel	16 " 24	P " R	.....	.....
Stove Castings	.....	.....	20 to 36	R to U
" " Notching	24	Rubber	.....	.....
Twist Drills, Hand Grinding	46 to 60	L to M	.....	.....
" " Special Machines	46	K " M	.....	.....
Wagon Springs, Ends of	20 to 30	P " R	.....	.....
Wire, Ends of Steel	36 " 80	Q " R	.....	.....
Wrought Iron	12 " 24	P " S	.....	.....
Woodworking Tools	46 " 60	K " M	.....	.....

STANDARD GRINDING WHEELS

STRAIGHT WHEELS

RULES FOR DETERMINING LIST PRICES

DIAMETER

Wheels with diameters less than 1 inch take the list of a 1-inch wheel.

Wheels with diameters represented by odd inches or fractional parts of inches, intermediate to diameters shown in list, take the list of the next larger diameter.

EXAMPLE: A wheel 5½ inches in diameter takes the list of a 6-inch wheel, and a wheel 12½ inches in diameter, or 13 inches in diameter, takes the list of a 14-inch wheel.

THICKNESS

Wheels thinner than ¼ inch take the list of a wheel ¼ inch thick.

Wheels with thicknesses intermediate to those shown in list take the list of the next thicker wheel.

EXAMPLE: A wheel 2⅝ inches thick takes the list of a 2¾-inch wheel.

Wheels thicker than 4 inches are figured proportionately to the 4-inch thickness; thickness to increase from 4 inches by quarter inches, and intermediate fractional parts of inches to be figured at next higher quarter of an inch.

EXAMPLE: To find the list price of a 30x7⅜-inch wheel, take the list of a 30x4-inch, which is 174.00, divide this by four and multiply by 7½ inches, which makes a list price of 326.25.

HOLE

An allowance is made of one third the list value of a wheel represented by the diameter of a hole 12 inches and larger. For holes less than 12 inches in diameter, or for countersinks of any size, no allowance is made.

EXAMPLE: To find the price of a 24x2x14-inch wheel, take the list of a 24x2-inch, which is 59.00, deduct from this one third the price of a 14x2-inch, or one third of 21.20, which is 7.05. 7.05 deducted from 59.00 gives the list price for a 24x2x14-inch wheel as 51.95.

If the diameter of a hole is represented by odd inches or fractional parts of inches not shown in list, the next smaller diameter is taken as representing the diameter of a wheel for which allowance is made, the thickness of such a wheel to be the same as the wheel from list of which the deduction is made.

EXAMPLE: To find the list of a 24x2⅛x15¾-inch wheel, take the list of a 24x2¼-inch wheel, or 65.00. Take from this one third the price of a 14x2¼-inch wheel, or one third of 23.50 which is 7.85. 7.85 deducted from 65.00 gives the list price of a 24x2⅛x15¾-inch wheel as 57.15.

Straight wheels with raised dovetails take the list of a straight wheel based on thickness at the face.

STANDARD GRINDING WHEEL LIST

STRAIGHT WHEELS

Effective July 1, 1915

Diameter Inches	Price, Each — Thickness of Wheels, Inches							
	¼	½	¾	1	1¼	1½	1¾	2
1	.40	.50	.60	.70	.80	.95	1.05	1.15
2	.60	.75	.90	1.00	1.15	1.30	1.45	1.60
3	.80	1.00	1.20	1.45	1.65	1.85	2.10	2.30
4	1.10	1.40	1.65	1.95	2.25	2.55	2.80	3.10
5	1.50	1.90	2.25	2.65	3.00	3.40	3.80	4.15
6	1.90	2.40	2.90	3.40	3.90	4.45	4.95	5.40
7	2.30	2.95	3.60	4.30	4.95	5.60	6.30	6.90
8	2.70	3.55	4.40	5.20	6.10	6.90	7.80	8.60
9	3.10	4.15	5.20	6.30	7.40	8.40	9.50	10.60
10	3.60	4.90	6.20	7.50	8.90	10.20	11.50	12.80
12	4.20	6.00	7.80	9.50	11.30	13.10	14.90	16.70
14	4.90	7.20	9.60	11.90	14.20	16.50	18.90	21.20
16	5.70	8.70	11.60	14.60	17.60	20.50	23.50	26.50
18	6.60	10.30	14.00	17.70	21.40	25.10	28.80	32.50
20	.....	12.30	16.80	21.40	25.90	30.50	35.00	39.60
22	.....	.....	20.10	25.60	31.10	36.70	42.20	47.70
24	.....	.....	24.00	30.60	37.30	44.00	51.00	59.00
26	.....	.....	.....	36.40	44.50	52.50	61.00	69.00
28	.....	.....	.....	.....	46.00	55.00	65.00	74.00
30	.....	.....	.....	.....	58.00	68.00	79.00	89.00
32	.....	.....	.....	.....	.....	72.00	84.00	96.00
34	.....	.....	.....	.....	.....	82.00	95.00	109.00
36	.....	.....	.....	.....	.....	94.00	109.00	124.00

Diameter Inches	Price, Each — Thickness of Wheels, Inches							
	2¼	2½	2¾	3	3¼	3½	3¾	4
1	1.25	1.35	1.45	1.55	1.70	1.80	1.90	2.00
2	1.75	1.85	2.00	2.15	2.30	2.40	2.55	2.70
3	2.50	2.70	2.95	3.15	3.35	3.55	3.80	4.00
4	3.40	3.70	4.00	4.25	4.55	4.80	5.10	5.40
5	4.55	4.90	5.30	5.70	6.05	6.40	6.80	7.20
6	5.95	6.50	7.00	7.50	8.00	8.50	9.00	9.50
7	7.55	8.20	8.90	9.60	10.25	10.90	11.55	12.20
8	9.45	10.30	11.15	12.00	12.85	13.70	14.55	15.40
9	11.65	12.70	13.75	14.80	15.90	17.00	18.05	19.10
10	14.10	15.40	16.70	18.00	19.35	20.70	22.00	23.30
12	18.45	20.20	22.00	23.80	25.55	27.30	29.10	30.90
14	23.50	25.80	28.15	30.50	32.80	35.10	37.45	39.80
16	29.45	32.40	35.35	38.30	41.30	44.30	47.25	50.20
18	36.15	39.80	43.50	47.20	50.90	54.60	58.30	62.00
20	44.15	48.70	53.35	58.00	62.50	67.00	71.50	76.00
22	53.35	59.00	64.50	70.00	75.50	81.00	86.50	92.00
24	65.00	71.00	78.00	85.00	92.00	99.00	106.00	113.00
26	77.00	85.00	93.00	101.00	109.00	117.00	125.00	133.00
28	83.00	92.00	102.00	111.00	120.00	129.00	139.00	148.00
30	100.00	111.00	122.00	132.00	143.00	153.00	164.00	174.00
32	109.00	121.00	133.00	145.00	157.00	169.00	181.00	193.00
34	123.00	136.00	150.00	163.00	177.00	191.00	204.00	218.00
36	139.00	154.00	169.00	183.00	198.00	213.00	228.00	243.00

Prices covering wheels of larger diameters and thicknesses, on application.

GRINDING WHEEL DRESSERS, LATHE TOOLS AND POLISHING MACHINES

GRINDING WHEEL DRESSERS

Fig. 30445A

Price	each	2.00
" Extra Cutters	per set	.40

DIAMOND HAND AND LATHE TOOLS

No. 1 SOLID SET DIAMOND HAND TOOL

Fig. 30445B

SOLID SET DIAMOND LATHE TOOL

Fig. 30445C

These tools are for truing, shaping and dressing grinding wheels, grindstones, etc. Prices upon application.

ST. LOUIS POLISHING MACHINES

POLISHING MACHINE HEAD

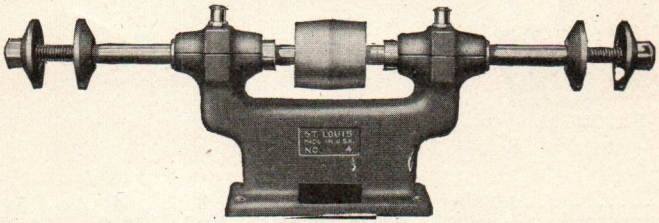


Fig. 30445D

These machines are the same high-grade design, workmanship and finish as the St. Louis grinders and have the same type of bearings. Made for bench or on column, either with plain pulley as illustrated, or with tight and loose pulleys.

Number		1	2	3	4
Diameter of Arbor in Collars	inches	5/8	3/4	7/8	1
" " " " Bearings	"	3/4	7/8	1 1/16	1 3/16
Length of Arbor	"	27	30	33	36
Distance between Wheels	"	22	24	27	29
Length of Bearing	"	3	3 1/2	4 1/4	4 3/4
Height to Center of Arbor on Bench	"	6	7	8	9
" " " " " " Column	"	42	42	42	42
Size of Base of Head	"	4x8	4 1/2x9	6x10 1/2	6 1/2x14
" " " " Column	"	10x14	11x15 1/2	12x16	13 1/2x17 1/2
Size Pulleys on Arbor	"	2 1/2x2 1/2	3x3	3 1/2x3 1/2	4x4
" Countershaft Drive Pulley	"	12x2 1/2	12x3	12x3 1/2	12x4
" " T. & L. "	"	4x3	6x3	6x3 1/2	6x4
Drop of Countershaft	"	6	6	8	8
Size of Shaft	"	24x1 1/16	24x1 1/16	26x1 3/16	30x1 3/16
Weight of Head	pounds	22	33	52	75
" " Column	"	65	85	90	105
" " Countershaft	"	55	60	70	85
" Complete	"	142	178	212	265
Price, Head only	each	**12.00**	**14.00**	**16.00**	**20.00**
" Column only	"	**10.00**	**12.00**	**14.00**	**16.00**
" Countershaft only	"	**11.00**	**13.00**	**15.00**	**17.00**
" Extra T. and L. Pulleys on Head	"	**2.50**	**2.50**	**4.00**	**4.00**
" Complete	"	**33.00**	**39.00**	**45.00**	**53.00**

No. 4 is not sold without column.

ST. LOUIS GRINDING MACHINES

MACHINE FOR DETACHED COUNTERSHAFT

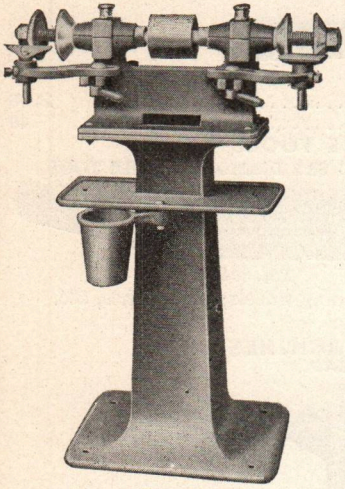


Fig. 29679A

REGULAR COUNTERSHAFT

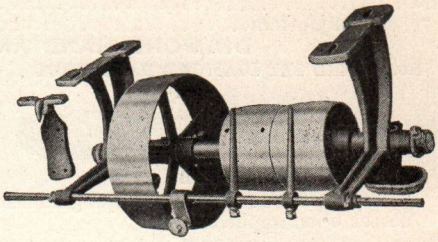


Fig. 29679B

Machine . . . . . number	1	2	3	4	5	6
Wheels Recommended . . . . . inches	6x1½	8x1½	10x2	12x2	14x2½	16x3
Diameter of Arbor in Collars . . "	⅝	¾	⅞	1	1⅛	1¼
" " " " Bearings . . "	¾	⅞	1 1/16	1 3/16	1 5/16	1½
Length of Arbor . . . . . "	17	19½	22	26	30	34
Distance between Wheels . . . . "	10¾	12	14½	18	21	23½
Length of Bearings . . . . . "	3	3½	4¼	4¾	5¼	6
Height to Center of Arbor . . . . "	4½	5½	6½	7½	8½	9
Size of Base of Head . . . . . "	4x8	4⅝x9	5¾x10½	6½x14	8x16½	10x19½
" " " " Column . . . . . "	10x14	11x15½	12x16	13½x17½	15x20	18x25
" Plain Pulley . . . . . "	2x2	2½x2½	3x3	3½x3½	4x4	6x4½
" Cone " . . . . . "	. . .	. . .	. . .	. . . .	. . .	5&6x4½
" T. and L. Pulley . . . . . "	2½x2	3x2	3½x2½	3½x3½	4x4	6&6x4
Speed C Shaft, Plain Pulley	531	497	478	465	455	427
" " " Cone "	. . .	. . .	. . .	. . .	. . .	572
" C. S. Drive, Plain Pulley	12x2	12x2½	12x3	12x3½	12x4	14x4½
" " " Cone "	. . . .	. . .	. . . .	. . . .	. . .	14&15x4½
" " T. and L. Pulley	4x2½	4x3	6x3	6x3½	6x4	8x5
Drop of Countershaft . . . . . inches	6	6	6	8	8	10
Size of Shaft . . . . . "	22x1 1/16	24x1 1/16	24x1 1/16	26x1 3/16	30x1 1/16	40x1½
Weight, Complete . . . . . pounds	147	183	217	265	345	520
Price, Head with Plain Pulley . . each	**12.00**	**14.00**	**16.00**	**20.00**	**25.00**	**33.00**
" Column . . . . . "	**11.00**	**13.00**	**15.00**	**18.00**	**21.00**	**27.00**
" Countershaft, Plain Pulley "	**10.00**	**11.00**	**13.00**	**15.00**	**17.00**	**22.00**
" Complete Machine with Detached Countershaft . . . . "	**33.00**	**38.00**	**44.00**	**53.00**	**63.00**	**82.00**
Price, Complete Machine with Self-contained Countershaft "	**37.00**	**44.00**	**50.00**	**60.00**	**70.00**	**92.00**
Price, Extra for Tight and Loose Pulley on Head . . . . . "	**2.50**	**2.50**	**2.50**	**4.00**	**4.00**	**5.00**

AMERICAN AND CHAMPION GRINDERS

AMERICAN SELF-OILING GRINDERS

Nos. 1, 2, 3 AND 4

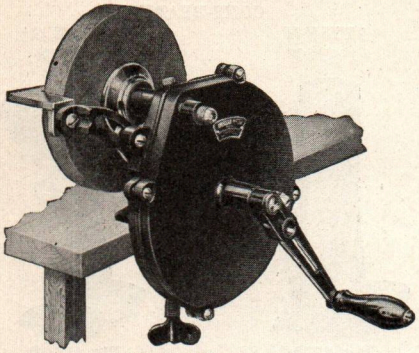


Fig. 21630A

No. 1

A small size for household use. It will fit easily into a drawer or cupboard when not in use. It is light in weight and easy to clamp on the kitchen table or sink. Size of grinding wheel, 4x1 inches.
Price.....each **4.50**

No. 2

This grinder will fit handily into a tool chest, but is big enough to do the largest tool grinding required by the carpenter or mechanic who goes out on the job. Size of grinding wheel, 5x1 inches.
Price.....each **6.50**

No. 3

Just the right size to have a permanent place at end of bench in small repair shops or private garages. Convenient for sharpening monument workers' lettering tools. Size of grinding wheel, 6x1 inches.
Price.....each **8.50**

No. 4

A powerful fast-cutting grinder for use in factories, machine shops, lumber camps, and on ranches and plantations. It is large in size and its smoothness in running makes heaviest grinding easy to handle. Size of grinding wheel, 7x1¼ inches.
Price.....each **11.50**

No. 5B—SICKLE AND TOOL GRINDERS

Ball-bearings and worm shaft drive insures smooth and noiseless transmission. Grinder is dirt-proof. Double malleable clamp locks grinder firmly and rigidly in place. Size of sickle wheel, 4½x3½ inches; tool wheel, 5x1¼ inches.
Price, including 2 Wheels.....each 10.00

AMERICAN SELF-OILING GRINDERS

No. 6, TILTING

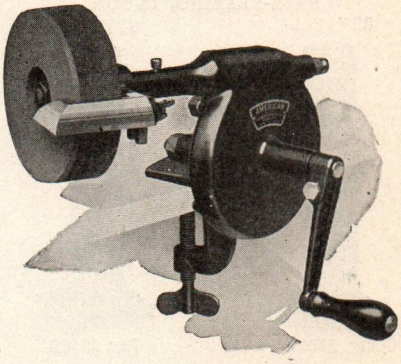


Fig. 21630B

For sharpening broad-edged tools, meat chopper blades, or for garage use. Ball bearings and worm shaft drive insure smooth, even transmission. Adjusts easily. Size of grinding wheel, 5x1½ inches.
Price.....each **8.50**

CHAMPION GRINDERS

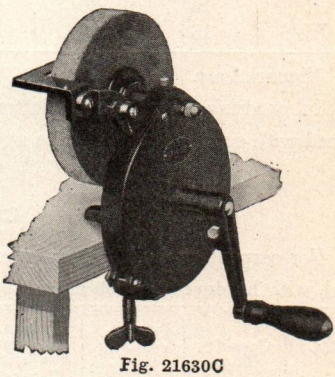


Fig. 21630C

This is a cheaper line of grinders than the American, not having the malleable clamp or self-oiling feature. A serviceable grinder, with enclosed machine-cut gears and japan finish.

Number.....	1	2	3
Size of Wheel..inches	4	5	6
Price.....each	**3.50**	**4.50**	**6.50**

NORTON JACKS

GENERAL PURPOSE JACKS

BALL-BEARING, 15-TON

STYLE A

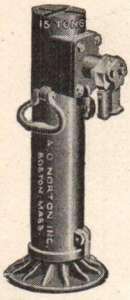


Fig. 2750A

STYLE M

Fig. 2750B

CONE-BEARING

STYLE Y
10-TON

Fig. 2750C

STYLE G†
15-TON

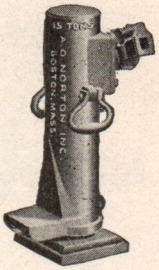


Fig. 2750D

BALL-BEARING

Style	Capacity Tons	Height Inches	Rise Inches	Diameter of Base Inches	Weight Pounds	Price Jack only	Price Hook only
A	15	26	13	10	110	70.00	10.00
M	15	26	13	*6x6	108	70.00	10.00
B	15	22	10	10	100	60.00	10.00
R	15	20	9	12	100	60.00	10.00
BL	15	18	7	10	95	60.00	10.00

*Square base.

In ordering, specify style letter, capacity and style base preferred. All jacks furnished with square or round base at same price.

CONE-BEARING

For carpenters, builders, boiler makers, truckmen, etc. Made of malleable iron and steel, with hardened tool steel bearing for end of screw.

Style	Capacity Tons	Height Over All Inches	Height of Foot from Ground Inches	Rise Inches	Size of Base Inches	Weight Pounds	Price Jack only	Price Hook only
Y	10	20	3	8	7½x7½	98	30.00	....
NJ	10	14	3	5¼	6x10	65	28.00	....
G	15	22	..	10	*10	105	30.00	8.00
G	15	22	..	10	*10	†110	†32.00	....
G	15	22	..	10	*10	†110	*†38.00	....

*Diameter. †Foot cast on shell. *†With hook.

NORTON JACKS

BALL-BEARING JACKS

35-TON, STYLE C

31-INCH

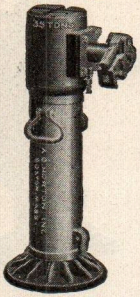


Fig. 2706A

26-INCH

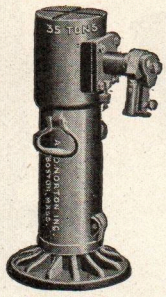


Fig. 2706B

DOUBLE SPEED
STYLE F

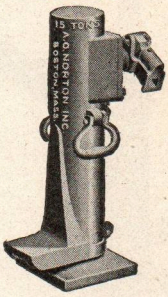


Fig. 2706B

BALL-BEARING CAR JACKS

Style Number	Capacity Tons	Height Inhes	Rise Inches	Diameter of Base Inches	Weight Pounds	Price Jack only	Price Hook only
NA	25	37	24	16	195	110.00	12.00
NA	25	30	17	12	170	95.00	10.00
NA	25	26	13	12	154	90.00	10.00
NA	25	24	11	13	148	85.00	10.00
NA	25	20	8	12	133	80.00	10.00
C	35	31	18	12	195	135.00	12.00
C	35	26	13	12	165	125.00	12.00
100	35	20	8	14	175	125.00	12.00

DOUBLE-SPEED BALL-BEARING JACKS

With Foot Lift

Style		F
Capacity	tons	15
Height	inches	24
Rise	"	12
Diameter of Base	"	10
Weight	pounds	115
Price	each	60.00

This jack has large gear on ratchet shaft, giving it double speed. It is constructed of malleable iron and steel throughout, is extra strong, and is especially adapted to electric plants, power houses or electric railways, and for handling heavy machinery, stone, etc., etc.

BARRETT PATENT LEVER JACKS

TRACK OR TRIP

No. 1
DOUBLE-ACTING

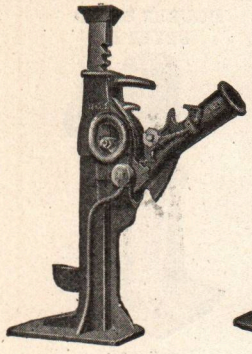


Fig. 7242A

No. 17
SINGLE-ACTING

Fig. 7242B

Track or trip jacks are recommended for track work only. The load can be instantly dropped from any elevation by means of a trip hook which disengages the raising mechanism from lifting rack.

No. 101
DOUBLE-ACTING

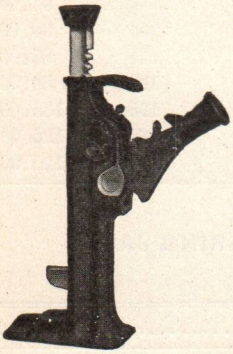


Fig. 7242C

A new jack of the same capacity, height and raise as No. 1 and embodying sweeping improvements in design and construction; made with a minimum number of working parts.

No.	Cap. Tons	*Height Inches	Raise Inches	**Weight Pounds	Price Each
1	10	24	13½	65	**22.00**
17	10	24	13¾	65	**22.00**
101	10	24	13½	65	**25.00**

*Closed. **With lever.

AUTOMATIC LOWERING

No. 2
DOUBLE-ACTING

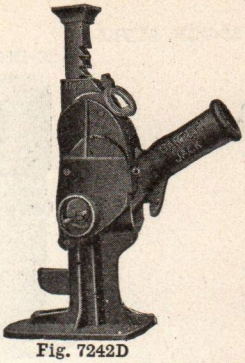


Fig. 7242D

No. 18
SINGLE-ACTING

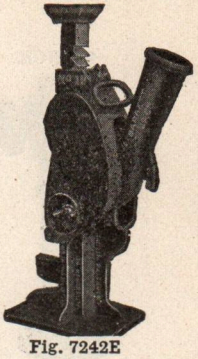


Fig. 7242E

On the No. 2 jack the load is moved up or down half a notch at each stroke on both upward and downward movements of lever.

No. 18 jack differs in operation by raising or lowering the load on downward stroke of lever only.

The load cannot be suddenly dropped as with a trip jack.

No. 10
TRIP AND AUTOMATIC

Fig. 7242F

The direction, either up or down, is controlled by eccentric at the side of the frame.

No.	Cap. Tons	*Height Inches	Raise Inches	**Weight Pounds	Price Each
50 D. A.	5	16	8	35	**16.00**
2 D. A.	10	21	10	73	**25.00**
10 D. A.	10	24½	14	75	**25.00**
3 D. A.	12	26½	15	95	**30.00**
4 D. A.	15	22	10	106	**35.00**
5 D. A.	15	28	15	124	**40.00**
18 S. A.	10	21	10	75	**25.00**
219 S. A.	15	28	17½	98	**40.00**

*Closed. **With lever.

VULCAN LOCOMOTIVE JACK SCREWS

Fig. 25161A

Capacity Tons	Diam. of Screw Inches	Height of Stand Inches	Height Over All Inches	Rise of Screw Inches	Price Each
10	1¼	4	6½	2¼	**2.90**
10	1¼	6	8½	4¼	**3.10**
10	1¼	8	10½	6¼	**3.40**
10	1¼	10	12½	8¼	**3.80**
10	1¼	12	14½	10¼	**4.20**
10	1¼	14	16½	12¼	**4.60**
12	1½	4	6¾	1¾	**3.25**
12	1½	5	7¾	2¾	**3.50**
12	1½	6	8¾	3¾	**3.75**
12	1½	8	10¾	5¾	**4.25**
12	1½	10	12¾	7¾	**4.75**
12	1½	12	14¾	9¾	**5.25**
12	1½	14	16¾	11¾	**6.00**
12	1½	16	18¾	13¾	**6.75**
16	1¾	6	9	3½	**4.50**
16	1¾	8	11	5½	**5.00**
16	1¾	10	13	7½	**5.75**
16	1¾	12	15	9½	**6.25**
16	1¾	14	17	11½	**6.75**
16	1¾	16	19	13½	**7.50**
16	1¾	18	21	15½	**8.50**
20	2	5	8½	2	**5.00**
20	2	6	9½	3	**5.25**
20	2	8	11½	5	**6.00**
20	2	10	13½	7	**6.75**
20	2	12	15½	9	**7.50**
20	2	14	17½	11	**8.25**
20	2	16	19½	13	**9.25**
20	2	18	21½	15	**10.25**
20	2	20	23½	17	**11.50**
20	2	22	25½	19	**12.50**
20	2	24	27½	21	**13.50**
24	2¼	6	9¾	2¾	**7.00**
24	2¼	8	11¾	4¾	**7.50**
24	2¼	10	13¾	6¾	**8.25**
24	2¼	12	15¾	8¾	**9.00**
24	2¼	14	17¾	10¾	**10.00**
24	2¼	16	19¾	12¾	**11.00**
24	2¼	18	21¾	14¾	**12.00**
24	2¼	20	23¾	16¾	**13.25**
24	2¼	22	25¾	18¾	**14.50**
24	2¼	24	27¾	20¾	**15.75**
28	2½	6	10	2¼	**7.75**
28	2½	6½	10½	2¾	**8.00**
28	2½	8	12	4¼	**8.75**
28	2½	10	14	6¼	**9.75**
28	2½	12	16	8¼	**10.75**
28	2½	14	18	10¼	**12.00**
28	2½	16	20	12¼	**13.25**
28	2½	18	22	14¼	**14.50**
28	2½	20	24	16¼	**15.75**
28	2½	22	26	18¼	**17.00**
28	2½	24	28	20¼	**18.25**
28	2½	26	30	22¼	**20.00**
28	2½	28	32	24¼	**22.00**
28	2½	30	34	26¼	**24.00**
28	2½	32	36	28¼	**26.00**
36	3	8	13	3½	**17.50**
36	3	14	19	9½	**19.50**
36	3	16	21	11½	**20.75**
36	3	18	23	13½	**22.00**
36	3	20	25	15½	**23.25**
36	3	22	27	17½	**24.50**
36	3	24	29	19½	**25.75**
36	3	26	31	21½	**27.00**
36	3	28	33	23½	**28.50**
36	3	30	35	25½	**30.00**
36	3	36	41	31½	**36.00**

Levers will be sent only when ordered, and will be charged for extra.

BARRETT JACKS

AUTOMOBILE

No. 088

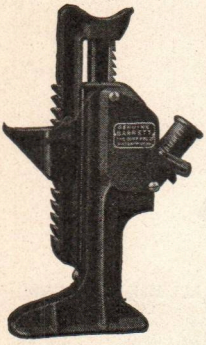


Fig. 376A

No. 311

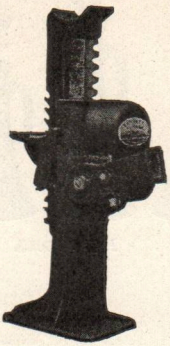


Fig. 376B

TRUCK
No. 100

Fig. 376C

AUTOMOBILE JACKS

The No. 088 meets, at a very moderate price, all utility requirements as to lifting capacity and different axle heights of the great majority of pleasure cars, and light commercial motor vehicles. The foot lift is of the quickly adjustable, sliding type, instantly set at any height on the rack to fit under the car axle, reserving the entire raise of the lifting rack for actual lifting of the car above the ground.

No. 311 is of original patented design, representing high development in motor jack construction. In its ease and convenience of operation, it has ample capacity for lifting the heaviest pleasure cars. It is automatically reversible and will withstand years of the roughest service.

No.	Capacity Tons	Height Closed Inches	Raise Inches	Weight with Lever Pounds	Price Each
088	1	11¼	6½	8½	....
311	1½	11	7	14	....

SINGLE-ACTING TRUCK JACKS

Nos. 100 and 200 are geared up, providing the easiest leverage of any jack yet developed for motor cars. A pressure of 15 pounds on the lever raises a load of 1000 pounds. They are for heavy motor cars, trucks, and for garage work.

No.	Capacity Tons	Height Closed Inches	Raise Inches	Weight with Lever Pounds	Price Each
100	3	10¾	5¼	16	.....
200	5	13	6¾	28	.....

JOYCE JACKS

PLAIN LEVER JACKS

No. 2A

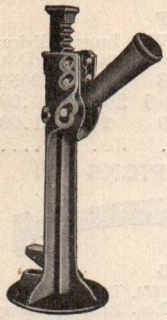


Fig. 31180A

No. 4

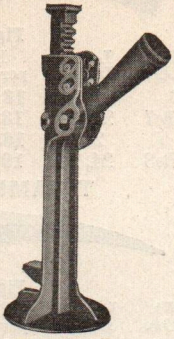


Fig. 31180B

This is the simplest form of jack for raising and lowering a load, consisting of a frame, a bar, a lever and a retaining pawl.

No. 6

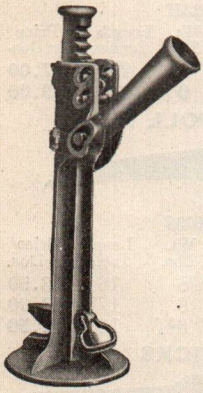


Fig. 31180C

The frame, lever socket and retaining pawl are malleable iron, the bar forged steel and the pinion of crucible steel.

The teeth on bar and pinion are milled. The pins are made of machinery steel and all wearing surfaces are hardened steel. This type of jack is used principally in mines and by truckers, riggers, teamsters and contractors.

They are exceedingly simple and free from complication.

No.	Will Lift Tons	Height When Down Inches	Rise of Bar Inches	Wt. Lbs.	Price Each
1A	2	16	8	24	**12.00**
2A	2	18½	10	28	**12.00**
2B	2	18½	10	25	**12.00**
4	4	22½	14	40	**17.00**
4A	4	18½	10½	37	**17.00**
6	15	26½	14	92	**30.00**
10	10	27	16	76	**24.00**
10A	10	22½	11½	63	**24.00**

AUTOMATIC LEVER JACKS

No. 67

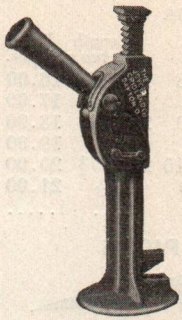


Fig. 31180D

No. 76

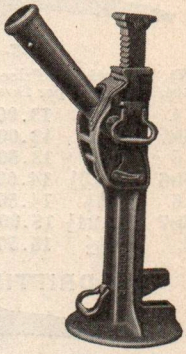


Fig. 31180E

The Full Automatic Lever Jack has been designed to meet the call for a strong and reliable jack of few working parts, in which the load can be either raised or lowered notch by notch with equal facility. The change from raising to lowering action is accomplished by simply shifting a small lever on the outside of the frame to either the position marked up or down.

No. 85

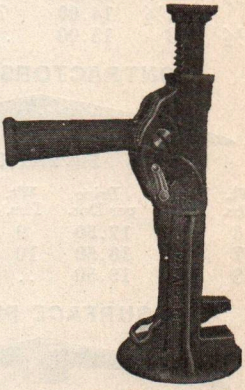


Fig. 31180F

The No. 74 Jack is shortened for journal box work; the foot and cap are omitted. Jacks have closed end lubricating-retaining bushing.

No.	Will Lift Tons	Height When Down Inches	Rise of Bar Inches	Wt. Lbs.	Price Each
66	5	14	6	33	**20.00**
67	5	16	8	34	**20.00**
68	5	19	11	39	**22.00**
74	10	11	4	35	**21.00**
76	10	22	13	54	**25.00**
81	12	27	17	88	**35.00**
84	15	22	10½	90	**35.00**
85	15	26½	15	105	**40.00**
86	15	36	25	128	**45.00**

PICKS

STANDARD RAILROAD PICKS

Fig. 27013A

Wt. Lbs.	Length Inches	Price per Doz.	Wt. Lbs.	Length Inches	Price per Doz.
4	21	13.00	7to8	24½,25½	16.00
4to5	21, 22	13.00	8	25½	17.00
5	22	13.50	8to9	25½,26½	18.00
5to6	22, 23½	14.00	9	26½	19.00
6	23½	14.50	9to10	26½,27½	20.00
6to7	23½,24½	15.00	10	27½	21.00
7	24½	15.50	..	....	.....

DRIFTING PICKS

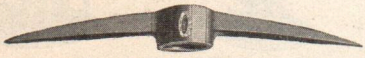


Fig. 27013B

Wt. Lbs.	Length Inches	Price per Doz.	Wt. Lbs.	Length Inches	Price per Doz.
3	21½	12.50	5	23½	16.00
3½	22	13.25	6	24	17.50
4	22½	14.00	7	25	20.00
4½	23	15.00	..	....	.....

CONTRACTORS' PICKS

Fig. 27013C

Wt. Lbs.	Length Inches	Price per Doz.	Wt. Lbs.	Length Inches	Price per Doz.
6	27	17.50	9	31	21.50
7	29	18.50	10	31½	23.50
8	30	19.50	..	....	.....

SURFACE PICKS

Fig. 27013D

Wt. Lbs.	Length Inches	Price per Doz.	Wt. Lbs.	Length Inches	Price per Doz.
4	22	14.00	6	25	18.00
4½	23	15.00	6½	25½	19.00
5	23½	16.00	7	26	20.00
5½	24	17.00	.	....	.....

PROSPECTORS' PICKS

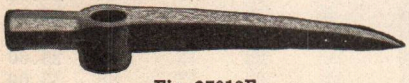


Fig. 27013E

Price, 3 Pounds.....per dozen **15.00**

TAMPING PICKS

Fig. 27013F

Wt. Lbs.	Length Inches	Price per Doz.	Wt. Lbs.	Length Inches	Price per Doz.
6	23	18.00	8	25	19.50
6to7	23, 24	18.00	8to9	25, 26	20.00
7	24	18.50	9	26	21.00
7to8	24, 25	19.00	.	..	.....

T TAMPING PICKS

Fig. 27013G

Wt. Lbs.	Length Inches	Price per Doz.	Wt. Lbs.	Length Inches	Price per Doz.
6	23	18.00	8	25	19.50
6to7	23,24	18.00	8to9	25, 26	20.00
7	24	18.50	9	26	21.00
7to8	24,25	19.00	...		.....

ORE PICKS

Fig. 27013H

Wt. Lbs.	Length Inches	Price per Doz.	Wt. Lbs.	Length Inches	Price per Doz.
6	21	14.50	8	23	17.00
7	22	15.50	9	24	19.00

MINING OR POLL PICKS

Fig. 27013J

Wt. Lbs.	Length Inches	Price per Doz.	Wt. Lbs.	Length Inches	Price per Doz.
3½	14½	15.00	5	16	18.50
4	15	16.00	6	17	20.00
4½	15½	17.00	6¾	18	21.50

MILL PICKS

Fig. 27013K

Price, 1½ Pounds.....per dozen **18.00**

BOILER PICKS

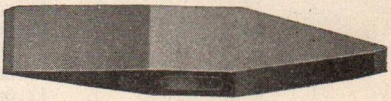


Fig. 27013L

Price, 1 Pound.....per dozen **18.00**

PICKS AND MATTOCKS

CONCRETE PICKS

Fig. 27033A

Weight Pounds	Length Inches	Price per Doz.	Weight Pounds	Length Inches	Price per Doz.
6	25	**17.50**	9	29	**21.50**
7	27	**18.50**	10	29½	**23.50**
8	28	**19.50**	..		.....

QUARRY PICKS

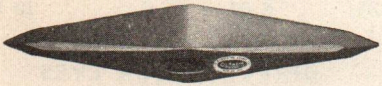


Fig. 27033B

Weight Pounds	Length Inches	Price per Doz.	Weight Pounds	Length Inches	Price per Doz.
5	13	**16.00**	7 to 8	15, 16	**18.50**
5 to 6	13, 14	**16.50**	8	16	**19.00**
6	14	**17.00**	8 to 9	16, 17	**19.50**
6 to 7	14, 15	**17.50**	9 " 10	17, 18	**21.00**
7	15	**18.00**	.....	.....	.....

STONE PICKS

Fig. 27033C

Weight Pounds	Length Inches	Price per Doz.	Weight Pounds	Length Inches	Price per Doz.
5	13	**16.00**	7 to 8	15, 16	**18.50**
5 to 6	13, 14	**16.50**	8	16	**19.00**
6	14	**17.00**	8 to 9	16.17	**19.50**
6 to 7	14, 15	**17.50**	9 " 10	17, 18	**21.00**
7	15	**18.00**	....	.....	.....

LOCOMOTIVE PICKS

CURVED EAR

Fig. 27033D

Price, 4 pounds.....per dozen **9.00**

STRAIGHT EAR

Fig. 27033E

Price, 4 Pounds.....per dozen **9.00**
" 5 " ..... " **9.50**

COAL PICKS

LONG EAR

Fig. 27033F

Weight Pounds	Length Inches	Price per Doz.	Weight Pounds	Length Inches	Price per Doz.
1½	14½	**8.50**	3¼	17½	**9.50**
2	15	**8.50**	3½	18	**10.00**
2¼	15½	**8.50**	4	18½	**10.50**
2½	16	**9.00**	4½	19	**11.00**
2¾	16½	**9.50**	5	19½	**11.50**
3	17	**9.50**	...	....	.....

SHORT EAR

Fig. 27033G

1½	14½	**8.50**	3¼	17½	**9.50**
2	15	**8.50**	3½	18	**10.00**
2¼	15½	**8.50**	4	18½	**10.50**
2½	16	**9.00**	4½	19	**11.00**
2¾	16½	**9.50**	5	19½	**11.50**
3	17	**9.50**	...	....	.....

PICK MATTOCKS

Fig. 27033H

Length of Pick Inches	Size of Hoe Inches	Weight Pounds	Price per Doz.
7¼	8x3¾	5	**16.00**
7½	8x4	6	**17.00**

SHORT CUTTER MATTOCKS

Fig. 27030J

Size Hole Inches	Size Cutter Inches	Weighs Pounds	Price per Doz.
8x3¾	4½x3¼	5	**16.00**
8x4	4½x3½	5½	**16.50**

LONG CUTTER MATTOCKS

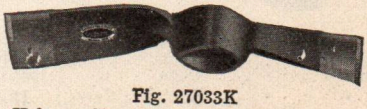


Fig. 27033K

Size Hole Inches	Size Cutter Inches	Weight Pounds	Price per Doz.
8x3¾	5½x3¼	5	**16.00**
8x4	6 x3½	6	**17.00**
8¼x4¼	6½x3½	7	**18.00**

MATTOCKS AND PICK EYES

BUSH MATTOCKS

Fig. 27014A

Length Inches	Width of Blade, Inches	Weight Pounds	Price per Doz.
18½	3½	6	18.00

CAMPING MATTOCKS

Fig. 27014B

Length Inches	Weight Pounds	Price per Doz.
13	2⅛	12.00

NURSERY MATTOCKS

Fig. 27014C

Length Inches	Weight Pounds	Price per Doz.
16	3	17.00

ASPHALT MATTOCKS

Fig. 27014D

Length Inches	Size, Cutter Inches	Weight Pounds	Price per Doz.
22	9½x3	9	25.00
23	10 x3⅛	10	27.00

COOPER'S FROES

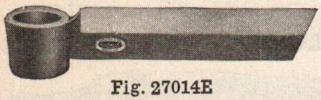


Fig. 27014E

Length Inches	Weight Pounds	Price per Doz.
8	3	13.00
10	3½	13.50
12	4	14.00
14	4½	14.50
16	5	15.00

COAL PICK EYES

Fig. 27014F

Weight Pounds	Price per Doz.	Weight Pounds	Price per Doz.
2	6.50	4½	9.00
2½	7.00	5	9.50
3	7.50	5½	10.00
3½	8.00	6	10.50
4	8.50	...	.....

DRIFTING PICK EYES

Fig. 27014G

Size No.	Weight Pounds	Price per Doz.
1	3	7.50
1½	3½	8.00
2	4	8.50
3	4½	9.00
4	5	9.50
5	6	10.50

RAILROAD PICK EYES

Fig. 27014H

Weight Pounds	Price per Doz.	Weight Pounds	Price per Doz.
4	8.50	5	9.50
4½	9.00	6	10.50

SURFACE PICK EYES

Fig. 27014J

Size No.	Weight Pounds	Price per Doz.
1	4	8.50
2	4½	9.00
3	5	9.50
4	5½	10.00
5	6	10.50
6	6½	11.00
7	7	11.50

HOES AND ADZES

GRUB HOES

WESTERN PATTERN

Fig. 27029A

BALTIMORE PATTERN

Fig. 27029B

WESTERN PATTERN

Size No.	Size Inches	Weight Pounds	Price per Doz.
0	10½x3½	3	**12.50**
1	10¾x3¾	3½	**13.00**
2	11 x4	4	**13.50**
3	11½x4¼	4½	**14.00**

BALTIMORE PATTERN

Size No.	Size Inches	Weight Pounds	Price per doz.
1	10¾x3¾	3½	**13.00**
2	11¼x4¼	4½	**14.00**
3	11½x4½	5	**15.00**
4	11¾x5	5¾	**16.00**

RAILROAD ADZES

Fig. 27029C

Forged from one piece of high carbon tool steel. Face of head hardened, polished bit, carefully tempered. Solid punched eye to fit a standard pick handle.

Length Inches	Width of Cutter, Inches	Weight Pounds
10	4½	4½
10½	4¾	5
11¼	5	5½

Prices upon Application.

HAZEL HOE

Fig. 27029D

ACCOMAC HOE

Fig. 27029E

HAZEL HOES

Size Inches	Weight Pounds	Price per Doz.
9½x6	3	**16.00**

ACCOMAC HOES

Length Inches	Size Inches	Weight Pounds	Price per Doz.
11	6	4	**16.00**
11¼	6½	4½	**17.00**
11½	7	5	**18.00**

ACCOMAC HOES
HEAVY PATTERN

Length Inches	Size Blade Inches	Weight Pounds	Price per Doz.
11	6	5	**18.00**
11¼	6½	5½	**19.00**
11½	7	6	**20.00**

VINEYARD HOE

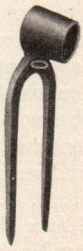


Fig. 27029F

PALMETTO HOE

Fig. 27029G

VINEYARD HOES

Size	Small	Large
Price.....per doz.	**13.50**	**16.00**

PALMETTO HOES

Length Over all Inches	Size Blade Inches	Weight Pounds
12¾	6½	5½

Prices upon application.

SAMSON CAR MOVERS

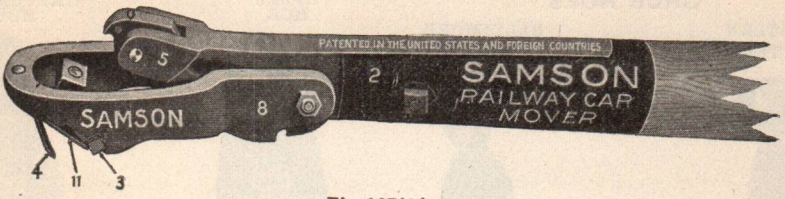


Fig. 10748A

REPAIRS

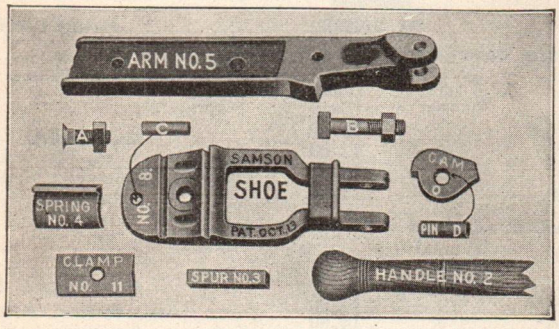


Fig. 10748B

The leverage on these movers being compound, as soon as pressure is brought to bear upon the handle the two points will come in contact with the car wheel at the proper rolling distance from the point where the wheel rests on the rail and in consequence the car wheel is immediately forced to turn instead of being lifted from the track as is the case with the ordinary pinch-bar and even with many makes of modern car movers.

They are equipped with a patent clamping device for holding the spur, which in itself is worthy of special mention, as the spur can be taken out and changed from a dull to a sharp edge, or replaced with a new spur readily.

The materials used in the construction of these movers is specially annealed malleable iron, refined crucible tool steel and second growth hard maple.

Price, Complete	each	5.00
" Cam No. 0, in the End of Arm No. 5	"	.25
" Clamp No. 11, to hold Spur No. 3	"	.20
" Wood Handle No. 2	"	1.50
" Spur, state if to be Square or Triangular	"	.30
" Spring No. 4, that slides on the Rail	"	.30
" Arm No. 5, Bolted to **the handle No. 2**	"	1.50
" Shoe No. 6, for Triangular Spur	"	1.50
" " " 8, " Square Spur	"	1.50

Weight of mover complete, 15 pounds.

TRACK TOOLS

CROWBARS

PINCH POINT

Fig. 15305A

WEDGE POINT

Fig. 15305B

Length.....inches	24	30	33	36	42	48	52	54	56	60
Size Square..... "	5/8	3/4	7/8	7/8	1	1	1 1/8	1 1/8	1 1/4	1 1/4
Weight.....pounds	3	4	5	6	8	10	12	14	16	18
Length.....inches	62	64	66	68	72	76	78	84	90	96
Size Square..... "	1 1/4	1 5/16	1 3/8	1 3/8	1 1/2	1 1/2	1 5/8	1 5/8	1 3/4	2
Weight.....pounds	20	22	24	26	28	30	35	40	50	75

Price, All Bars, 10 to 40 Pounds.....per pound .15
" Small Bars, Under 10 Pounds..... " .18
" Bars 41 to 50 pounds..... " .16
" " Over 50 Pounds, Each Additional 25 Pounds, Extra..... " .01

LINING BARS

ROUND OR DIAMOND POINT

Fig. 15305C

Price, 16, 18, 20, 22 or 24 Pounds.....per pound .15

CLAW BARS WITH HEEL

Fig. 15305D

Price, 20, 24, 26, 28 or 30 Pounds.....per pound .15

CLAW BARS WITHOUT HEEL

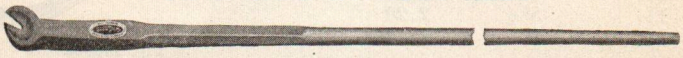


Fig. 15305E

Price, 30 Pounds.....per pound .15

CLAW BARS, GOOSE NECK

Fig. 15305F

Price, 26, 28 or 30 Pounds.....per pound .15

TAMPING BARS

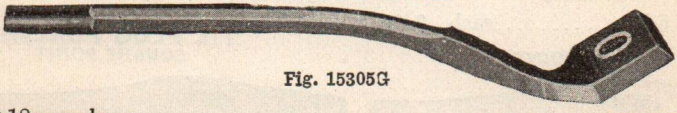


Fig. 15305G

Price, 13 to 18 pounds.....per pound .15

TAMPING BARS, R. M. A.

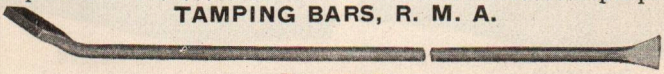


Fig. 15305H

Price, 13 Pounds.....per pound .15

TRACK TOOLS

RAIL TONGS

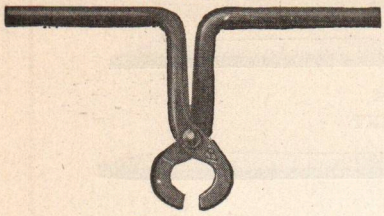


Fig. 15330A

Across Handles.....inches 39
Price.....each **3.60**

RAIL FORKS

Fig. 15330B

Length.....inches 34
Price.....each **2.00**

TRACK CHISELS

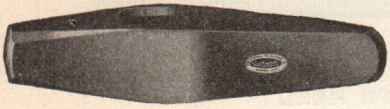


Fig. 15330C

Length Inches	Size Bit Inches	Weight Pounds	Price Each
8¼	1 3/16	4	**1.60**
8½	1 3/16	4½	**1.80**
9	1¼	5	**2.00**
9¼	1¼	5½	**2.20**
9½	1¼	6	**2.40**

TRACK PUNCHES

ROUND POINT

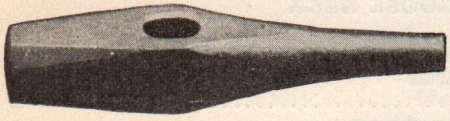


Fig. 15330D

Price, About 5 Lbs.....each **2.00**

SQUARE POINT

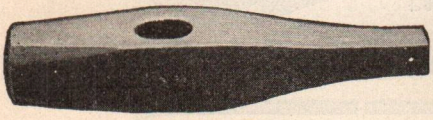


Fig. 15330E

Price, About 5 Lbs.....each **2.00**

TIE TONGS

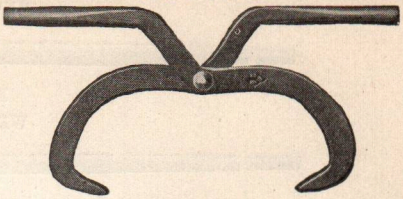


Fig. 15330F

Across Handles.....inches 36
Greatest Opening..... " 19
Weight.....pounds 15
Price.....each **3.00**

TRACK WRENCHES

SINGLE END

Fig. 15330G

Furnished in three styles: Single end,

DOUBLE END

Fig. 15330H

Double end, and in the S pattern with double end.

S-DOUBLE END

Fig. 15330J

Opening Single End Inches	Size Bolt Inches	Length Inches	Average Weight Pounds
15/16	½	20	3¼
1⅛	⅝	24	4¾
1 5/16	¾	26	5½
1½	⅞	28	6½
1 11/16	1	30	8½
1⅞	1⅛	32	9½

Price ..... per pound .40

TIE PLUG PUNCHES

SQUARE POINT

Fig. 15330K

Weight about 3½ pounds.
Price.....each **1.50**

TRACK TOOLS

HUNTINGTON STANDARD TRACK GAUGES

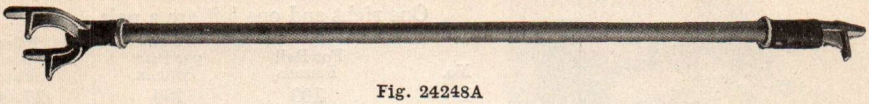


Fig. 24248A

Price, without Insulation	per dozen	15.00
" with Weatherproof Insulation	"	22.50

McMANUS GAUGES AND LEVELS

Fig. 24248B

Price	per dozen	45.00

INSULATED GAUGES, WITH ADJUSTABLE LEVEL AND GRADUATED ELEVATION SLIDE

Fig. 24248C

Price	per dozen	67.50

WOODEN TRACK LEVELS

Fig. 24248D

Price, without Insulation	per dozen	22.50
" Insulated	"	22.50

COMBINED LEVEL AND SPOT BOARDS

Fig. 24248E

Price	per dozen	37.50

ALDON CAR REPLACERS, RAIL BENDERS, ETC.

CAR AND ENGINE REPLACERS

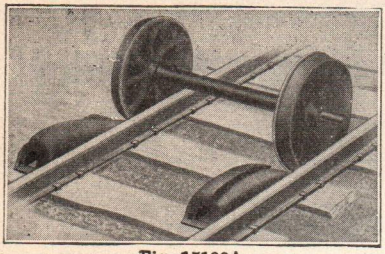


Fig. 15188A

One right and one left are a pair.

No.	For Rail Pounds	Weight per Pair Pounds	Price per Pair
1	100	200	**25.00**
2	85	180	**24.00**
3	70	100	**16.00**
3½	50	100	**16.00**
4	35	60	**14.00**

RAIL BENDERS

JIM CROW TYPE

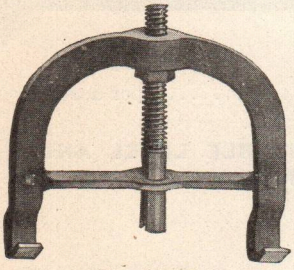


Fig. 15188B

CAPSTAN TYPE

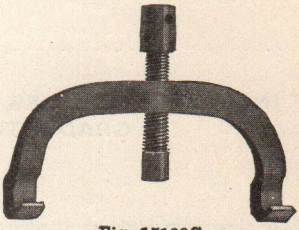


Fig. 15188C

The Jim Crow Type is furnished with wrench. The Capstan type is not furnished with turning bar. The following applies to both types.

Number.....inches	1	2	3	4	5	6
To Bend Rails.....pounds	100	75	60	30	20	16
Weight..... "	180	145	115	85	65	40
Price.....each	**30.00**	**25.00**	**22.00**	**18.00**	**15.00**	**14.00**

STANDARD TRACK DRILLS

AUTOMATIC FEED

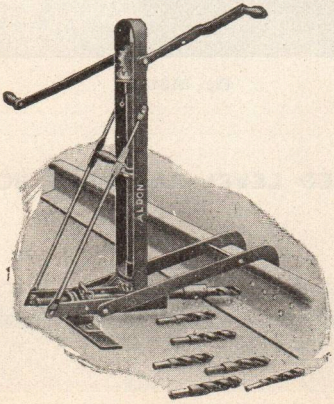


Fig. 15188D

These drills take twist bits having ⅝-inch round shank.

Price, without Bits; Weight, 65 pounds.....each **25.00**

WEIGHTS, ETC., OF STEEL RAILS, AND FASTENINGS

STEEL RAIL

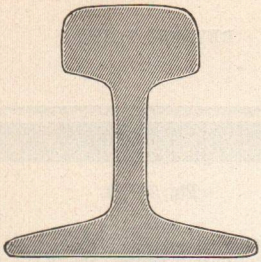


Fig. 1295A

STANDARD FOUR-BOLT JOINT

Fig. 1295B

RAILS, PER MILE

Weight, per yard..pounds	100	95	90	85	80	75	72	70	68
Gross tons .....per mile	157.14	149.28	141.22	133.57	125.72	117.85	113.14	110.00	106.85
Weight, per yard..pounds	67	66	65	64	63	62	60	58	57
Gross tons .....per mile	105.28	103.71	102.14	100.55	99.00	97.43	94.30	91.14	89.55
Weight, per yard..pounds	56	55	52	50	45	40	35	30	25
Gross tons .....per mile	88.00	86.42	81.71	78.57	70.71	62.86	55.00	47.14	39.29
Weight, per yard..pounds	20	16	14	12	10	8	.....	.....	.....
Gross tons .....per mile	31.43	25.14	22.00	18.85	15.71	12.57	.....	.....	.....

FASTENINGS, PER MILE

Length of Rail .....feet	30	28	26	24	22	20	18
Number of Splice Bars	704	754	812	880	960	1056	1174
" " Bolts	1408	1508	1624	1760	1980	2112	2348

FASTENINGS, PER TON OF RAIL

Weight of Rail	8	10	12	14	16	20
Feet of Track	420	336	280	240	210	168
Joints Complete, 20-foot Rails.....	42	34	28	24	21	17
" " 30 " "	28	23	19	16	14	12

CROSSTIES, PER MILE OF SINGLE TRACK

Center to Center.....inches	18	24	27	30	33	36
Number of Ties.....	3520	2641	2348	2113	1921	1761

TABLE OF CUBIC YARDS OF BALLAST, PER MILE

Side slope of the ballast 1 to 1. Width in clear between tracks of double track road, 6 feet.

Depth Inches	Top Width, Single Track, Feet			Top Width, Double Track, Feet		
	10	11	12	21	22	23
	Cubic Yds.	Cubic Yds.	Cubic Yds.	Cubic Yds.	Cubic Yds.	Cubic Yds.
12	2152	2347	2543	4303	4499	4695
18	3374	3667	3960	6600	6894	7188
24	1941	5085	5474	8996	9388	9780
30	1914	6600	7087	11490	18066	12470

V or sawmillrail, state size and quantity desired.

SPIKES

RAILROAD SPIKES

TRACK SPIKES

REGULAR

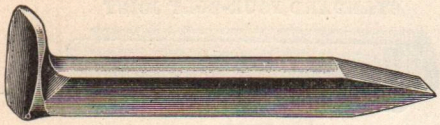


Fig. 7575A

Size under Head Inches	Approx. Number per Keg	Ties 2 Feet between Centers 4 Spikes per Tie Makes per Mile Pounds	Kegs	Rail Used Weight per Yard Pounds
5½x9/16	360	5870	29⅓	45 to 70
5 x9/16	400	5170	26	40 " 56
5 x½	450	4660	23⅓	35 " 40
4½x½	530	3960	20	28 " 35
4 x½	600	3520	17⅔	24 " 35
4½x7/16	680	3110	15½	20 " 30

REVERSE POINT

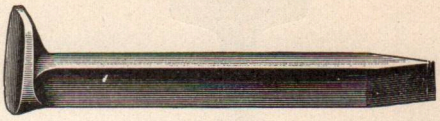


Fig. 7575B

Size under Head Inches	Approx. Number per Keg	Ties 2 Feet between Centers 4 Spikes per Tie Makes per Mile Pounds	Kegs	Rail Used Weight per Yard Pounds
4 x7/16	720	2940	14¾	20 to 30
3½x7/16	900	2350	11¾	16 " 25
4 x⅜	1000	2090	10½	16 " 25
3½x⅜	1190	1780	9	16 " 20
3 x⅜	1240	1710	8	16 " 20
2½x⅜	1342	1575	7⅞	12 " 16

RAILROAD SPIKES—EXTRA OVER BASE

3 to 5x½	per 100 pounds	.15
3½ to 4½x7/16	" 100 "	.25
3 to 4½x⅜	" 100 "	.40
2½x⅜	" 100 "	.65
Reverse Points 5½x9/16 only	" 100 "	.25
Rolled Points	" 100 "	.10
Orders for less than 200 Kegs	" 100 "	1.00

Other sizes, special prices.

BOAT SPIKES

Fig. 7575C

NUMBER OF BOAT SPIKES TO 200-POUND KEG

Square Diam. Inches	Length, Inches 3	4	5	6	7	8	9	10	11	12	14	16
⅝	....	....	....	....	...	260	240	220	205	190	175	160
½	....	....	....	450	375	335	300	275	260	240	...	...
7/16	....	....	....	600	590	510	400	360	320	230	...	...
⅜	1320	1140	940	800	650	600	525	475	...	...	...	...
5/16	1660	1360	1230	1175	990	880	...	...	...	...	...	...
¼	3000	2375	2050	1825	...	...	...	...	...	...	...	...

BOAT SPIKES—EXTRA OVER BASE

4 to 12x⅜	per 100 pounds	.30
6 " 12x7/16	" 100 "	.20
6 " 16x½	" 100 "	.15
8 " 16x⅝	" 100 "	.15
12 " 24x¾	" 100 "	.15

TRACK BOLTS, ETC.

WITH U. S. STANDARD SQUARE NUT

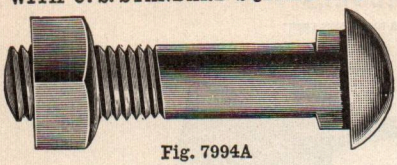


Fig. 7994A

WITH U. S. STANDARD HEXAGON NUT

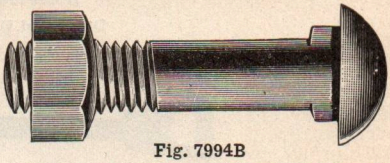


Fig. 7994B

Rails Used Pounds	Size Bolts Inches	Diam. of Nuts In.	With Square Nuts		With Hex. Nuts		Rails Used Pounds	Size Bolts Inches	Diam. of Nuts In.	With Square Nuts		With Hex. Nuts	
			No. in 200-lb. Keg	Kegs per Mile 4-bolt Joint	No. in 200-lb. Keg	Kegs per Mile 4-bolt Joint				No. in 200-lb. Keg	Kegs per Mile 4-bolt Joint	No. in 200-lb. Keg	Kegs per Mile 4-bolt Joint
70 to 100	1 x5	1 5/8	105	13.4	110	13.0	45 to 85	3/4x4	1 1/4	231	6.1	240	6.
70 " 100	1 x4 3/4	1 5/8	110	12.8	115	12.3	45 " 85	3/4x3 7/8	1 1/4	235	6.	247	5.8
70 " 100	1 x4 1/2	1 5/8	115	12.2	120	11.8	45 " 85	3/4x3 3/4	1 1/4	239	5.9	254	5.7
70 " 100	1 x4 1/4	1 5/8	120	11.7	125	11.2	45 " 85	3/4x3 5/8	1 1/4	242	5.8	257	5.6
70 " 100	1 x4	1 5/8	125	11.2	130	10.8	45 " 85	3/4x3 1/2	1 1/4	245	5 7	260	5.5
70 " 100	1 x3 3/4	1 5/8	130	10.8	135	10.4	45 " 85	3/4x3 1/4	1 1/4	250	5.6	266	5.3
70 " 100	1 x3 1/2	1 5/8	135	10.4	140	10.	45 " 85	3/4x3	1 1/4	268	5.2	283	5.
70 " 100	1 x3 1/4	1 5/8	140	10.1	145	9.7	30 " 40	3/4x2 3/4	1 1/4	286	5.0	300	4.7
70 " 100	1 x3	1 5/8	145	9.8	150	9.4	30 " 40	3/4x2 1/2	1 1/4	304	4.6	317	4.4
70 " 100	7/8x5 1/2	1 7/16	136	10.1	143	9.8	30 " 40	5/8x3 1/2	1 1/16	360	4.	375	3.8
70 " 100	7/8x5 1/4	1 7/16	140	10.	148	9.5	30 " 40	5/8x3 1/4	1 1/16	375	3.8	392	3.6
70 " 100	7/8x5	1 7/16	144	9.8	153	9.2	30 " 40	5/8x3	1 1/16	395	3.6	410	3.4
70 " 100	7/8x4 3/4	1 7/16	149	9.5	158	8.9	30 " 40	5/8x2 3/4	1 1/16	420	3.3	435	3.2
70 " 100	7/8x4 1/2	1 7/16	155	9.1	163	8.6	30 " 40	5/8x2 1/2	1 1/16	445	3.1	465	3.
70 " 100	7/8x4 1/4	1 7/16	159	8.9	168	8.4	20 " 30	5/8x2 1/4	1 1/16	470	3.	495	2.8
70 " 100	7/8x4	1 7/16	163	8.6	173	8.1	20 " 30	5/8x2	1 1/16	495	2.9	525	2.7
45 " 85	7/8x3 7/8	1 7/16	166	8.5	178	7.9	20 " 30	1/2x3	7/8	665	2.2	715	2.
45 " 85	7/8x3 3/4	1 7/16	170	8.3	183	7.7	20 " 30	1/2x2 3/4	7/8	690	2.1	737	1.9
45 " 85	7/8x3 1/2	1 7/16	174	8.1	188	7.5	20 " 30	1/2x2 1/2	7/8	715	2.	760	1.9
45 " 85	7/8x3 1/4	1 7/16	178	8.	193	7.3	20 " 30	1/2x2 1/4	7/8	750	2.	800	1.8
45 " 85	7/8x3	1 7/16	182	7.7	198	7.1	20 " 30	1/2x2	7/8	775	2.	820	1.7
45 " 85	3/4x5 3/4	1 1/4	178	7.9	200	7.	12 " 16	1/2x1 3/4	7/8	870	1.5	890	1.6
45 " 85	3/4x5 1/2	1 1/4	186	7.6	205	6.8	12 " 16	1/2x1 1/2	7/8	960	1.	980	1.4
45 " 85	3/4x5 1/4	1 1/4	196	7.2	210	6.7	12 " 16	1/2x1 3/8	7/8	1050	1.	1070	1.2
45 " 85	3/4x5	1 1/4	205	6.8	215	6.6	12 " 16	1/2x1 1/4	7/8	1140	1.	1160	1.2
45 " 85	3/4x4 3/4	1 1/4	212	6.6	220	6.4	12 " 16	3/8x2	11/16	1560	1.	1590	1.
45 " 85	3/4x4 1/2	1 1/4	218	6.4	225	6.3	12 " 16	3/8x1 3/4	11/16	1680	1.	1710	1.
45 " 85	3/4x4 1/4	1 1/4	224	6.3	230	6.2	12 " 16	3/8x1 1/2	11/16	1800	1.	1830	1.
45 " 85	3/4x4 1/8	1 1/4	229	6.2	235	6.1	8 " 12	3/8x1 1/4	11/16	1975	1.	2010	1.

EXTRAS PER 100 POUNDS OVER BASE

Diam. Length Inches	1 1/4 to 3/4		5/8		9/16 and 1/2		7/16		3/8	
	Square Nut	Hex. Nut	Square Nut	Hex. Nut	Square Nut	Hex. Nut	Square Nut	Hex. Nut	Square Nut	Hex. Nut
3 1/2	Base	.30	.30	.55	....	....	....	....	....	....
3 1/4	.20	.40	.35	.60	....	....	....	....	....	....
3	.30	.50	.40	.65	.85	1.30	....	....	....	....
2 3/4	.40	.60	.50	.75	1.00	1.45	....	....	....	....
2 1/2	...	...	.60	.85	1.15	1.60	1.55	2.00	....	....
2 1/4	...	...	.75	1.00	1.20	1.75	1.75	2.20	2.40	2.95
2	...	...	...	....	1.35	1.90	1.95	2.40	2.65	3.20
1 3/4	...	...	...	....	1.55	2.10	2.15	2.60	2.90	3.45
1 1/2	...	...	...	....	1.65	2.25	2.35	2.80	3.15	3.70

U. S. standard square nuts will be furnished unless otherwise specified.

SHOVELS

MINING SHOVELS

D HANDLE, SQUARE POINT

Fig. 30415A

No.	Size No.	Width Inches	Length Inches	Finish	Weight per Dozen Pounds	Price per Dozen
40	2	9½	11¾	Black	58	**21.90**
41	3	10¼	12½	"	61	**22.60**
42	4	10⅞	13⅛	"	66	**23.25**
43	5	11⅝	13½	"	71	**24.00**
44	6	12	14	"	74	**24.85**
45	8	12½	14¾	"	80	**25.80**
500	2	9½	11¾	"	58	**19.30**
514	3	10¼	12½	"	60	**20.10**
515	4	10⅞	13⅛	"	66	**21.15**
516	5	11⅝	13½	"	70	**21.90**
517	6	12	14	"	71	**22.80**

LONG HANDLE, SQUARE POINT

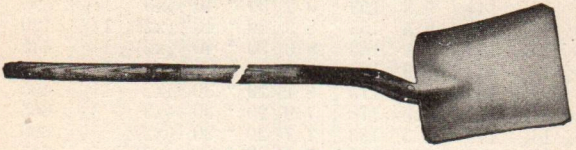


Fig. 30415B

No.	Size No.	Width Inches	Length Inches	Finish	Weight per Dozen Pounds	Price per Dozen
53	2	9½	11¾	Black	64	**22.05**
54	3	10½	12½	"	68	**22.75**
55	4	10⅞	13⅛	"	73	**23.40**
56	5	11⅝	13½	"	74	**24.00**
57	6	12	14¾	"	76	**24.60**
58	8	12½	14¾	"	81	**25.80**
504	2	9½	11¾	"	60	**19.35**

RAILROAD TRACK SHOVELS

D HANDLE, SQUARE POINT

WOOD D HANDLE

Fig. 30415C

MALLEABLE IRON D HANDLE

Fig. 30415D

No.	Size No.	Width Inches	Length Inches	Style of Handle	Finish	Weight per Dozen Pounds	Price per Dozen
B-2	2	9½	11¾	Wood D	Black	64	**23.50**
B-2	2	9½	11¾	Mall. D	"	72	**23.50**

SHOVELS

RAILROAD TRACK SHOVELS

D HANDLE, ROUND POINT

Fig. 30416A

No.	Size No.	Width Inches	Length Inches	Finish	Weight per Dozen Pounds	Price per Dozen
67	2	9¼	13	Black	55	**21.90**
68	3	10¾	12½	"	60	**22.60**
4	4	10½	14	"	62	**23.25**
5	5	11	14½	"	65	**23.80**
70	2	9¼	13	Polished	49	**23.20**
503	2	9¼	13	"	55	**21.10**

MINING AND DITCHING SHOVELS

LONG HANDLE, ROUND POINT

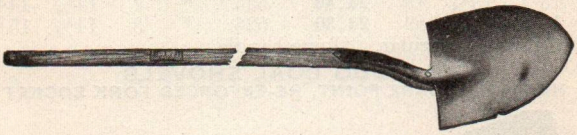


Fig. 30416B

No.	Size No.	Style	Width Inches	Length Inches	Finish	Weight per Dozen Pounds	Price per Dozen
61	2	Stiff	9½	12	Black	57	**21.75**
610	2	Stiff, Thick Center	9½	12	"	62	**22.65**
64	2	Stiff	9½	12	Polished	52	**23.25**
194	2	"	9½	12	"	55	**24.75**
195	2	Half Spring	9½	12	"	56	**24.75**
196	2	Full "	9½	12	"	57	**24.75**
507	2	Stiff	9½	12	"	52	**20.80**
D–202	2	"	9¾	11¾	"	63	**21.85**
D–204	2	Half Spring	9¾	11¾	"	62	**23.35**
D– 53	3	Stiff	9¾	12½	"	63	**24.55**

IRRIGATING SHOVELS

LONG HANDLE, ROUND POINT, SOLID SOCKET SHANK

Fig. 30416C

No. G-82 has a 5-inch lift, and G-52 has a 6⅛-inch lift. To find the lift, lay the shovel on the floor and measure the distance between the point of shovel and floor.

No.	Size No.	Style	Width Inches	Length Inches	Finish	Weight per Dozen Pounds	Price per Dozen
G-52	2	Stiff	9¼	11¾	Polished	66	**27.60**
G-82	2	"	9½	11¾	"	62	**27.55**

SHOVELS

COAL AND COKE SHOVELS

D HANDLE, SQUARE POINT

Fig. 30423A

Nos. 171 to 175, inclusive, are black finish; Nos. 181 to 526, inclusive are half polished.

No.	Used for	Size No.	Width Inches	Length Inches	Weight per Doz. Pounds	Price per Dozen	No.	Used for	Size No.	Width Inches	Length Inches	Weight per Doz. Pounds	Price per Dozen
171	Coal	1	13½	13¾	75	**22.90**	183	Coal	3	15¾	15¼	90	**24.85**
172	"	2	14¼	14¾	81	**23.55**	*185	"	5	15	17	96	**26.10**
173	"	3	14¾	15¼	88	**24.40**	†185	Coke	5	15¼	17	102	**27.25**
*175	"	5	15	17	96	**26.25**	524	Coal	1	13½	13¾	70	**21.15**
181	"	1	13½	13¾	73	**23.40**	525	"	2	14¼	14¾	76	**22.05**
182	"	2	14¼	14¾	89	**24.30**	526	"	3	14¾	15¼	80	**22.90**

* One gauge heavier than regular. †Long handle.

GOLD BUG COAL SHOVELS

HANDLE, SQUARE POINT, RE-ENFORCED FORK SOCKET

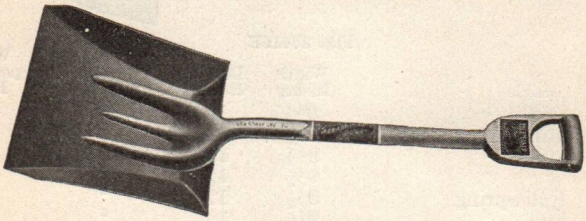


Fig. 30423B

No.	Size No.	Width Inches	Length Inches	Finish	Weight per Dozen Pounds	Price per Dozen
1	1	13	13¾	Black	69	**22.60**
2	2	13½	14½	"	72	**23.25**
3	3	14½	15	"	78	**23.95**
5	5	14½	17½	"	84	**25.20**

MOLDER'S SHOVELS

SOLID D HANDLE

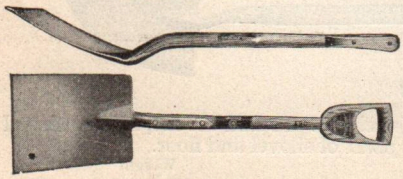


Fig. 30423C

SPLIT D HANDLE

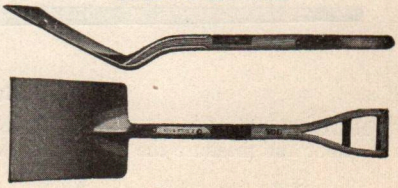


Fig. 30423D

Size blade, 10x11½ inches. Weight, per dozen, 57 pounds.

Price, Polished, with Either Style Handle . . . . . per dozen **29.50**

SHOVELS AND SCOOPS

COAL MINING MACHINE SHOVELS

LONG HANDLE, SQUARE POINT, FLAT BLADE

Fig. 30417A

Size blade, 10x12 inches. Length handle, 52 inches. Weight, per dozen, 75 pounds.
No. B-600.....per dozen **25.65**

SCOOPS

D HANDLE

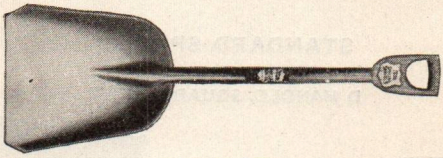


Fig. 30417B

Number	Style	Size Number	Width Inches	Length Inches	Finish	Weight per Dozen Pounds	Price per Dozen
*282½	Narrow	2	9	15	Black	67	**21.30**
82	Narrow, Thick Center	2	11	15	"	68	**24.90**
83	" " "	3	11¼	15½	"	70	**25.50**
135	Western, Thick Center	5	13½	16	"	80	**28.50**
136	" " "	6	13½	16½	"	85	**29.35**
137	" " "	7	13⅞	17	"	87	**30.25**
138	" " "	8	14¼	17½	"	90	**30.75**
142	" " "	12	15½	19½	Black, Plain	96	**33.60**
144	" " "	4	12½	15½	Half Polished	75	**28.45**
145	" " "	5	13½	16	"	80	**29.25**
145	Long Handle, Thick Center	5	13½	16	"	80	**29.25**
146	Thick Center	6	13½	16½	"	85	**30.15**
148	Western, Thick Center	8	14¾	17½	"	90	**31.80**
**165	Western	5	12	16½	"	80	**29.40**
282	Narrow	2	11½	15	Black	67	**21.30**
283	"	3	11¼	15½	"	74	**22.30**
2136	Western Pattern	6	13½	16½	"	82	**85.00**
2144	" "	4	12½	15½	Half Polished	74	**24.00**
2145	" "	5	13½	16	" "	80	**25.00**
2147	" "	7	13⅞	17	" "	86	**26.80**
2148	" "	8	14¾	17½	" "	91	**27.75**
2150	" "	10	15	18¾	" "	92	**29.50**
2152	" "	12	15½	19½	" "	98	**31.30**

*Furnace scoop. **Charging scoop.

SCOOPS, SPADES AND D HEADS

LOCOMOTIVE FIRING SCOOPS

D HANDLE

Fig. 30418A

No.	Style	Size No.	Width Inches	Length Inches	Finish	Weight per Dozen Pounds	Price per Dozen
B-2	Eastern Pattern	4	11½	16	Black	80	**24.70**
B-2	" "	5	12	16½	"	87	**25.65**
B-2	" "	7	12¾	17	"	90	**27.45**

STANDARD SPADES

D HANDLE, SQUARE POINT

Fig. 30418B

No.	Size No.	Width Blade, Inches Top	Width Blade, Inches Point	Length Blade Inches	Finish	Weight per Dozen Pounds	Price per Dozen
51i	2	7½	7⅛	12	Polished	56	**18.90**

MALLEABLE IRON D HANDLE HEADS

Fig. 30418C

For tamping. Opening for hand, 3¼ inches. Socket, 2¼ inches long, tapered from 1-inch to 2⅛-inch and chamfered at large end to prevent injury to handle when driving on. Weight, per dozen, 11¾ pounds.

Price.....per dozen **2.00**

SHOVEL, SPADE, SCOOP AND FORK HANDLES

D SHOVEL HANDLE, REGULAR BEND

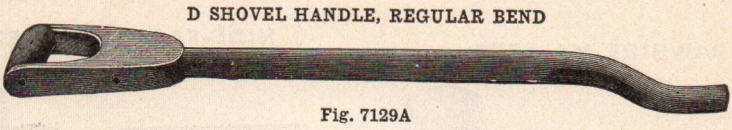


Fig. 7129A

D SPADE

Fig. 7129B

D CHISHOLM SHOVEL, SPADE OR SCOOP HANDLE, BENT

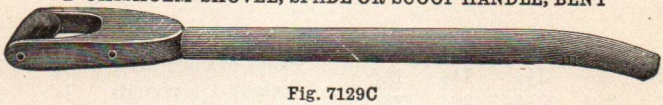


Fig. 7129C

D SCOOP

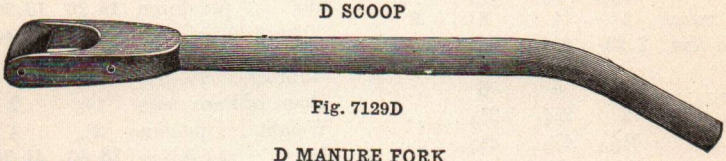


Fig. 7129D

D MANURE FORK

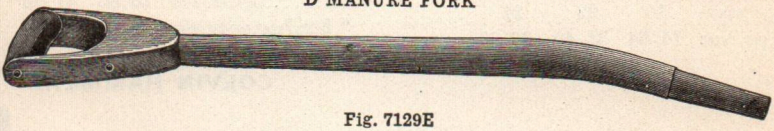


Fig. 7129E

D SPADING FORK

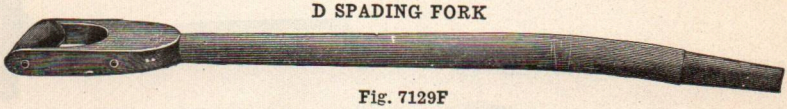


Fig. 7129F

LONG SHOVEL HANDLE, AMES BEND

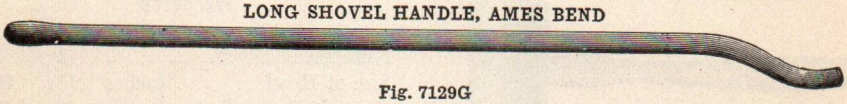


Fig. 7129G

D COKE FORK HANDLE, STRAP FERRULES AND CAPS

Fig. 7129H

Grade		XX	X	No. 1
Regular or Ames Bend Shovel Handles	per dozen	8.90	7.40	6.40
Spade and Chisholm Handles	"	8.60	7.10	6.10
Scoop Handles	"	8.90	7.40	6.40
Manure and Spading	"	8.40	6.90	5.90
Spading Fork Handles	"	8.40	6.90	5.90
Long Shovel Handles, Ames Bend	"	8.00	5.70	4.80
D Coke Fork Handles, without Ferrules	"	8.90	7.40	6.40
D " " " with Strap Ferrules and Caps	"	13.40	11.90	10.90

MALLETS AND HAMMERS

RAWHIDE MALLETS

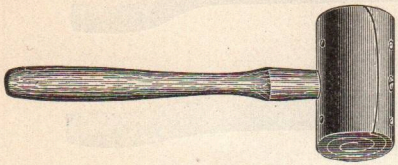


Fig. 5735A

Number.....	0	1	2	3
Diam.....inches	1	1¼	1½	1¾
Length..... "	2⅜	3⅛	3¼	3⅜
Weight.....ounces	2	4	6	8
Price....per dozen	**7.20**	**8.64**	**10.08**	**11.52**

Number.....	4	5	6	....
Diam.....inches	2	2¾	2¾	....
Length..... "	3½	4¼	4¾	....
Weight.....ounces	10	22	24	....
Price....per dozen	**14.64**	**32.40**	**36.60**	....

HIDE-FACED HAMMERS

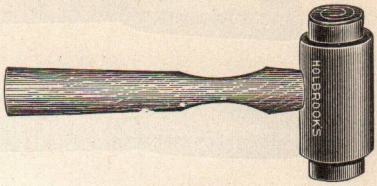


Fig. 5735C

Number.....	0	1	2
Diam. of Face..inches	⅞	1¼	1½
Weight ....pounds	½	1⅛	1⅝
Price.....per dozen	**16.20**	**18.96**	**24.12**
" Extra Faces, per doz. pairs	**5.04**	**5.40**	**6.48**

Number.....	3	4	5
Diam. of Face..inches	1¾	2	2¾
Weight ....pounds	2¼	4	5¾
Price.....per dozen	**28.80**	**41.76**	**59.88**
" Extra Faces, per doz. pairs	**8.28**	**11.52**	**16.32**

COLVIN HAMMERS

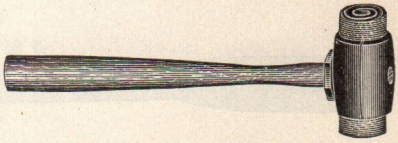


Fig. 5735D

Number.....	1	3
Size of Head.....inches	1¼	1¾
Weight with Rawhide Heads....ounces	18	27
Price " " " ....each	**1.00**	**1.50**
" " Wooden " .... "	**.85**	**1.20**
" without Heads..... "	**.75**	**1.10**
" Extra Rawhide Heads...per dozen	**2.00**	**3.50**
" " Wooden " ... "	**.75**	**.80**

Number.....	4	....
Size of Head.....inches	2	....
Weight with Rawhide Heads....ounces	48	....
Price " " " ....each	**2.00**	....
" " Wooden " .... "	**1.55**	....
" without Heads..... "	**1.40**	....
" Extra Rawhide Heads...per dozen	**4.50**	....
" " Wooden " ... "	**1.00**	....

LOADED RAWHIDE MALLETS

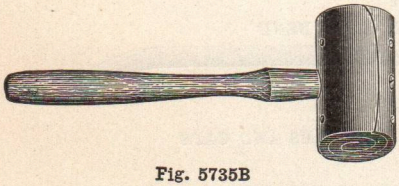


Fig. 5735B

Number.....	7	8	9
Diameter ....inches	1¼	1½	1¾
Length..... "	3⅛	3¼	3⅜
Weight .....ounces	8	12	18
Price .....per dozen	**10.20**	**11.40**	**13.20**

Number.....	10	11	....
Diameter ....inches	2	2¾	....
Length..... "	3½	4¼	....
Weight .....ounces	20	44	....
Price .....per dozen	**16.44**	**36.48**	....

HAMMERS

NAIL HAMMERS

DOUBLE OCTAGON PATTERN — OCTAGON HEAD ROUND NECK

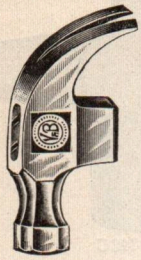


Fig. 13709A

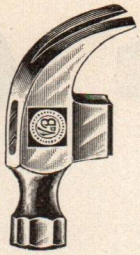


Fig. 13709B

DOUBLE OCTAGON PATTERN

Number	1	1½	2	3
Length . inches	14	13	13	12
Weight . ounces	21	17	14	8
Price . per doz.	**11.50**	**11.00**	**10.50**	**10.00**

OCTAGON HEAD, ROUND NECK

Number	1½
Length . . . . . inches	13
Weight . . . . . ounces	17
Price . . . . . per doz.	**11.00**

NAIL HAMMERS

PLAIN FACE — BELL FACE

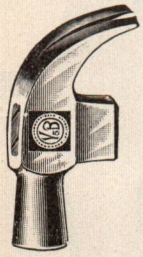


Fig. 13709C

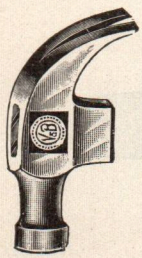


Fig. 13709D

PLAIN FACE

Number	1	1½	2	3
Length . . . . inches	14	13	13	12
Weight . . . . ounces	20	16	13	7
Price . . . . per doz.	**9.00**	**8.50**	**8.00**	**7.50**

BELL FACE

Number	11	11½	12
Length . . . . . inches	14	13	13
Weight . . . . . ounces	20	16	13
Price . . . . . per doz.	**9.00**	**8.50**	**8.00**
Number	12½	13	14
Length . . . . . inches	12½	12	11
Weight . . . . . ounces	10	7	5
Price . . . . . per doz.	**7.75**	**7.50**	**7.25**

TINNERS' HAMMERS

RIVETING — PANEING

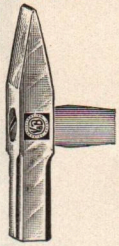


Fig. 13709E

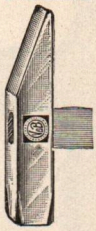


Fig. 13709F

TINNERS' RIVETING HAMMERS

Number	1	2	3
Length . . . . . inches	13	14	15
Weight . . . . . ounces	8	12	16
Price . . . . . per doz.	**6.00**	**6.25**	**6.75**

TINNERS' PANEING HAMMERS

Number	1	2	3
Length . . . . . inches	13	14	15
Weight . . . . . ounces	8	12	16
Price . . . . . per doz.	**6.00**	**6.25**	**6.75**

CHIPPING HAMMERS

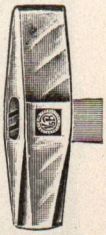


Fig. 13709G

Number	0	1
Length . . . . . in.	15	15
Weight . . . . . oz.	20	24
Price . . per doz.	**13.00**	**13.50**
Number	2	3
Length . . . . . in.	16	16
Weight . . . . . oz.	32	40
Price . . per doz.	**14.50**	**15.00**
Number	4	. . . . .
Length . . . . . in.	17	. . . . .
Weight . . . . . oz.	46	. . . . .
Price . . per doz.	**16.50**	. . . . .

BRICKLAYERS' HAMMERS

Number	1	2
Length . . inches	11	11
Weight . . ounces	24	32
Price . . per doz.	**14.00**	**15.00**

BRICKLAYERS' SCUTCHES

Number	10	12
Length . . inches	11	11
Weight . . ounces	24	32
Price . . per doz.	**14.00**	**15.00**

Fig. 13709H

HAMMERS

BALL PEIN

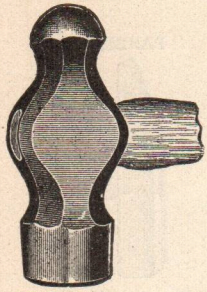


Fig. 3742A

STRAIGHT PEIN

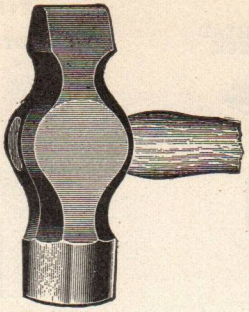


Fig. 3742B

CROSS PEIN

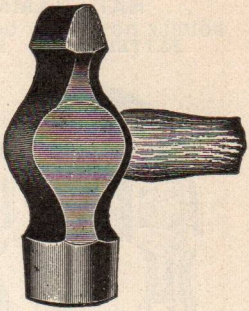


Fig. 3742C

MACHINISTS' BALL, STRAIGHT OR CROSS PEIN

Number	OOOOO	OOOO	OOO	OO	O	1	2
Weight ....each	4 oz.	6 oz.	8 oz.	12 oz.	1 lb.	1¼ lbs.	1½ lbs.
Price ....per dozen	12.00	12.00	12.00	12.00	12.50	13.50	14.50
Number	3	4	5	6	7	8	9
Weight ....each	1¾ lbs.	2 lbs.	2¼ lbs.	2½ lbs.	2¾ lbs.	3 lbs.	3½ lbs.
Price ....per dozen	15.50	16.50	17.50	19.00	20.50	22.00	24.00

ENGINEER'S SINGLE FACE

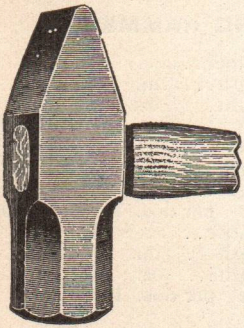


Fig. 3742D

ENGINEER'S DOUBLE FACE

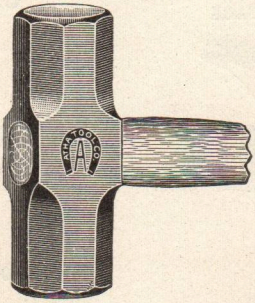


Fig. 3742E

BLACKSMITH'S HAND

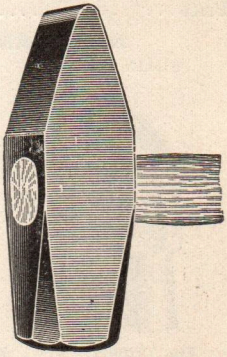


Fig. 3742F

ENGINEERS'

Number	0	1	2	3	4	5	6
Weight, Single Face....each	1 lb. 2 oz.	1 lb. 10 oz.	2 lbs.	2½ lbs.	3 lbs.	3½ lbs.	4½ lbs.
" Double " .... "	.....	1½ lbs.	2⅜ lbs.	3 lbs.	3⅝ lbs.	.....	.....
Price, Single Face....per dozen	12.00	13.00	14.00	15.00	16.00	17.00	19.00
" Double " .... "	.....	14.50	16.50	18.00	19.50	.....	.....

BLACKSMITHS' HAND

Number	0	1	2	3	4	5
Weight ....each	1 lb. 10 oz.	2 lbs.	2 lbs. 10 oz.	3 lbs.	3½ lbs.	4½ lbs.
Price ....per dozen	13.00	14.00	15.00	16.00	17.00	19.00

Weights on above hammers do not include handle.

HAMMERS, AXES AND SLEDGES

BUSH HAMMER — MASON SINGLE — HAMMERS WITH TEETH

Fig. 29640A

Fig. 29640B

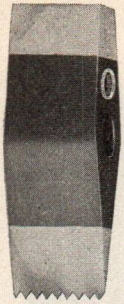


Fig. 29640C

BUSH HAMMERS

In weights from 4 to 10 pounds.
Price.....per pound 1.00

MASON HAMMERS
SINGLE FACE

Price, Under 3 Pounds....per pound .60
" 3 to 5 " .... " .55
" 5 Pounds and Over. " .50

MASON HAMMERS
WITH TEETH

Price, Under 3 Pounds....per pound .65
" 3 to 5 " .... " .60
" 5 Pounds and Over. " .55

STONE AXE — SPAULING SINGLE — HAMMERS DOUBLE

Fig. 29640D

Fig. 29640E

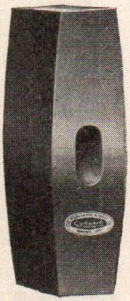


Fig. 29640F

STONE AXES

Price, 4 Pounds.....per pound .55
" 5 to 12 Pounds .. " .50

SPAULING HAMMERS
SINGLE FACE

Price, 3 to 4 Pounds....per pound .50
" 5 " 24 " .... " .40

DOUBLE FACE

Price, 3 to 4 Pounds....per pound .50
" 5 " 24 " .... " .40

STRIKING HAMMERS

NEVADA — OREGON — MISSOURI

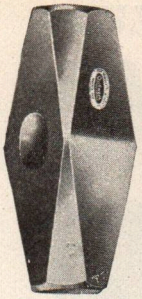


Fig. 29640G

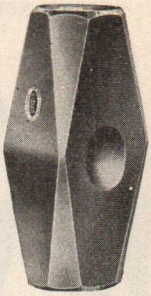


Fig. 29640H

Fig. 29640J

NEVADA—LONG PATTERN

In weights from 2 to 50 pounds.
Price, 3 to 4 Pounds....per pound .40
" 5 " 50 " .... " .30

OREGON—SHORT PATTERN

In weights from 3 to 20 pounds.
Price, 3 to 4 Pounds....per pound .40
" 5 " 20 " .... " .30

MISSOURI PATTERN

In weights from 3 to 20 pounds.
Price, 3 to 4 Pounds....per pound .40
" 5 " 20 " .... " .30

STONE SLEDGE — COAL SLEDGE — STONE HAMMER

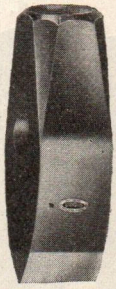


Fig. 29640K

Fig. 29640L

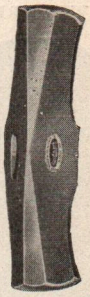


Fig. 29640M

STONE SLEDGES
OVAL OR FLAT FACE

In weights from 2 to 40 pounds.
Price, 5 Pounds and Over..per pound .30

COAL SLEDGES OR MAULS

In weights from 4 to 8 pounds.
Price.....per pound .30

STONE CUTTER'S HAMMERS
ITALIAN OR DAGO PATTERN

In weights from 3 to 5 pounds.
Price.....per pound .80

HAMMERS, SLEDGES AND MAULS

HAND DRILLING HAMMERS

NAPPING HAMMER — CALIFORNIA PATTERN — NEW ENGLAND PATTERN

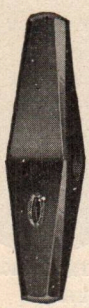
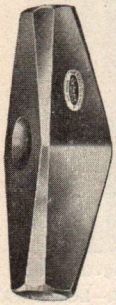
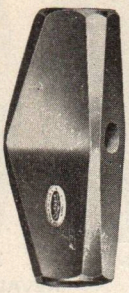




Fig. 29641A Fig. 29641B Fig. 29641C

NAPPING HAMMERS

Price, 2 Pounds	per pound	.50
" 4 "	"	.40
" 6 "	"	.30

HAND DRILLING HAMMERS
CALIFORNIA—WESTERN PATTERN

Price, 2 Pounds	per pound	.55
" 3 to 4 Pounds	"	.50

NEW ENGLAND PATTERN

Weight	pounds	2	3½	5
Price	per pound	.55	.50	.40

HORSESHOE TURNING SLEDGES — WESTERN — OCTAGON — CROSS PEIN SLEDGE N. E.

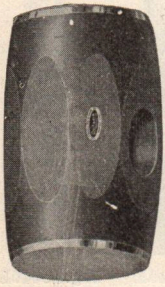
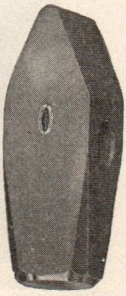



Fig. 29641D Fig. 29641E Fig. 29641F

HORSESHOE TURNING SLEDGES
WESTERN PATTERN

Price, 6 Pounds	per pound	.30
" 8 to 10 Pounds	"	.30

OCTAGON PATTERN

In weights from 6 to 10 pounds.

Price	per pound	.40

CROSS PEIN SLEDGES
NEW ENGLAND PATTERN

Weight	pounds	1½-2	4	6-14
Price	per pound	.50	.40	.30

BLACKSMITHS' SLEDGES

DOUBLE FACE — CROSS PEIN — STRAIGHT PEIN

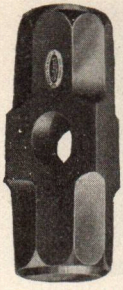
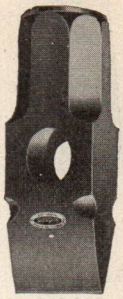
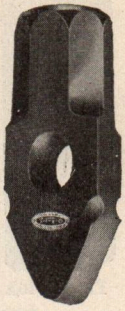




Fig. 29641G Fig. 29641H Fig. 29641J

DOUBLE FACE

Weight	pounds	2	4	6-14
Price	per pound	.50	.40	.30

CROSS PEIN

In weights from 5 to 40 pounds. Having two faces is most economical.

Price	per pound	.50

STRAIGHT PEIN

The weights, dimensions and prices are the same as Cross Pein.

SPIKE MAULS

STANDARD PATTERN — BELL PATTERN — P. R. R. PATTERN

Fig. 29641K Fig. 29641L Fig. 29641M

STANDARD PATTERN

Length	inches	11	12	12¾
Weight	pounds	6	8	10
Price	per pound	.30	.30	.30

BELL OR PITTSBURG PATTERN

Length	inches	15¼
Weight	pounds	10
Price	per pound	.30

PENN. R. R. PATTERN

Length	inches	13
Weight	pounds	10
Price	per pound	.30

SINGLE AND DOUBLE-BIT AXES

SINGLE-BIT AXES

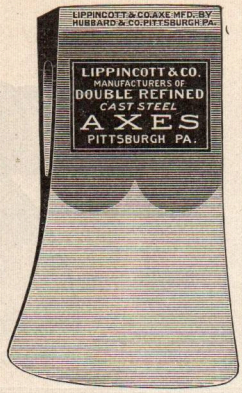


Fig. 26698A

The material used in the construction of this axe is the best, and the workmanship employed in its forging, grinding and tempering, the most skilled obtainable. Has plain, polished bit and poll, red and gold bronze finish. Fully warranted.

Weights, Ass't. lbs.	3 to 4	3½ to 4½
Price....per dozen	.....	.....
Weights, Ass't.lbs.	4 to 5	4½ to 5½
Price....per dozen	.....	.....
Weights, Ass't.lbs.	4½ to 6	5 to 6
Price....per dozen	.....	.....

SINGLE-BIT HANDLED AXES

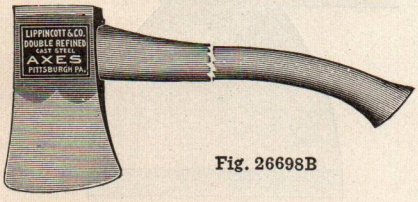


Fig. 26698B

Axe will hold securely. Will not fly off the handle.

Weights given below are without handles. Prices are for axes with XX octagon handles.

Weights, Ass't...lbs.	3 to 4	3½ to 4
Price.....per dozen	.....	.....
Weights, Ass't...lbs.	4 to 5	4½ to 5½
Price.....per dozen	.....	.....
Weights, Ass't...lbs.	4½ to 6	5 to 6
Price.....per dozen	.....	.....

DOUBLE-BIT AXES

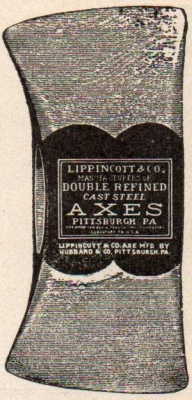


Fig. 26698C

The forging in this axe is done by hand by a special continuous process, which saves several heatings, and thoroughly refines the steel. The bit or cutting edge is the finest crucible steel, carefully tempered by a special process, to a degree that obtains a strong, keen edge, requiring little grinding to be kept in shape. Polished, gold bronze finish, finely finished.

Weigths, Ass't.pounds	3½ to 4½	4 to 5
Price.....per dozen	.....	....
Weights, Ass't.pounds	4½ to 5½	.....
Price.....per dozen	.....	.....

DOUBLE-BIT HANDLED AXES

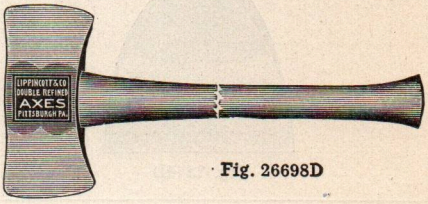


Fig. 26698D

Axe will hold securely, and will not fly off the handle.

Weights given below are without handles. Prices are for axes with XX octagon handles.

Weights, Ass't.pounds	3½ to 4½	4 to 5
Price.....per dozen	.....	....
Weights, Ass't.pounds	4½ to 5½	.....
Price.....per dozen	.....	....

HATCHETS

SHINGLING

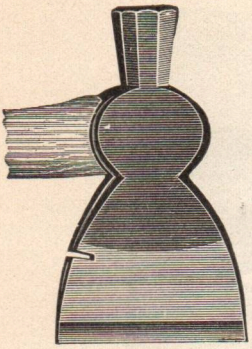


Fig. 7574A

HALF

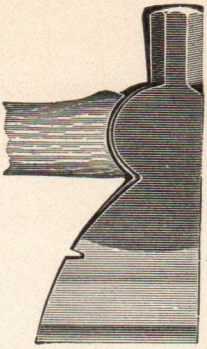


Fig. 7574B

LATHING

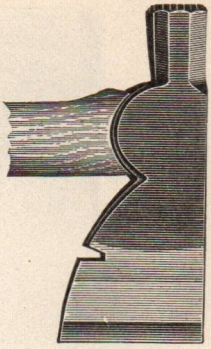


Fig. 7574C

Kind	Shingling			Half			Lathing		
Number	1	2	3	1	2	3	1	2	3
Width of Bit ... inches	3½	4	4½	3¼	3⅝	4	2¼	2½	2¾
Weight, each	1 lb. 1 oz.	1 lb. 7 oz.	1 lb. 13 oz.	15 oz.	1 lb. 5 oz.	1 lb. 11 oz.	14 oz.	1 lb. 1 oz.	1 lb. 4 oz.
Price, Bronzed ... per dozen	8.00	8.50	9.00	8.50	9.00	9.50	8.00	8.50	9.00
" Full Polished ... "	10.50	11.00	11.50	11.00	11.50	12.00	10.50	11.00	11.50

CLAW

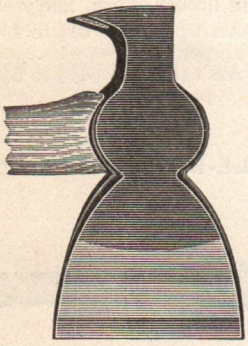


Fig. 7574D

BROAD

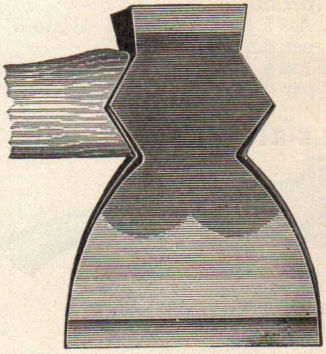


Fig. 7574E

Kind	Claw			Broad				
Number	1	2	3	2	3	4	5	6
Width of Bit ... inches	3½	4	4½	4½	5	5½	6	6½
Weight, each	1 lb. 3 oz.	1 lb. 9 oz.	1 lb. 15 oz.	1 lb. 12 oz.	2 lbs. 2 oz.	2 lbs. 8 oz.	2 lbs. 14 oz.	3 lbs. 4 oz.
Price, Bronzed ... per dozen	9.00	9.50	10.00	11.50	13.00	14.50	16.50	18.00
" Full Polished ... "	11.50	12.00	12.50	14.50	17.00	18.50	20.50	22.00

Weights do not include handles.

HANDLES

ADZE EYE HAMMER

Fig. 1383A

MACHINIST HAMMER

Fig. 1383B

HATCHET

Fig. 1383C

BOYS' AXE

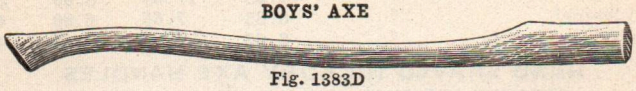


Fig. 1383D

SINGLE BIT AXE

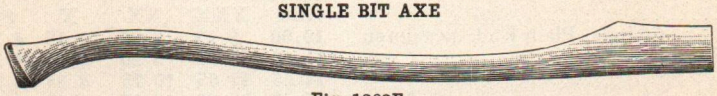


Fig. 1383E

DOUBLE BIT AXE

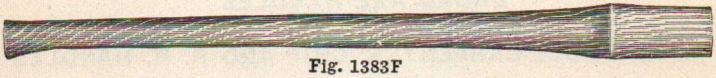


Fig. 1383F

BROAD AXE

Fig. 1383G

ADZE

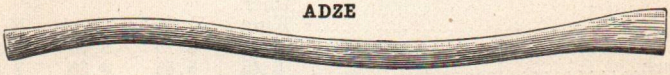


Fig. 1383H

SLEDGE, TOOL, AND MAUL

Fig. 1383J

R. R. PICK AND MATTOCK

Fig. 1383K

COAL PICK

Fig. 1383L

HANDLES

TURNED HICKORY AXE HANDLES

MARKET AND N. N. Y. PATTERN

Quality		Extra	Exclr.	No. 1	No. 2	No. 3
36, 34, 32 and 30-inch	per dozen	8.65	7.65	6.80	5.65	4.25
Boys' 28 " 26 "	"	7.15	6.45	5.10	4.05	....
Single and Double Bit 38-inch	"	10.65	8.95	7.05	5.65	....
" " " " 40 "	"	11.65	10.05	7.35	5.35	....
" " " " 42 "	"	12.65	10.65	8.00	5.40	....
" " " " 44 "	"	14.65	11.65	8.65	5.40	....
Straight 30 to 36-inch	"	8.65	7.65	6.80	4.95	3.85
Double Bitted 30 to 36-inch	"	8.65	7.65	6.80	4.95	3.20

HAND SHAVED HICKORY AXE HANDLES

OCTAGON AND OVAL. SINGLE AND DOUBLE BIT

Quality		Amer. King	XXX	XX	X	A SB	A DB
36, 34, 32 and 30-inch, Plain End	per dozen	10.50	9.15	8.65	7.15	4.25	3.20
38-inch, Plain End	"	11.45	10.65	9.80	8.15	4 25	3.20
40 " " "	"	14.25	12.65	10.75	8.85	4.25	3.20
42 " " "	"	15.45	13.65	12.15	9.85	4.25	3.20
44 " " "	"	16.65	14.65	13.20	10.90	4.25	3.20
30 and 36-inch, Scroll End	"	10.50	9.15	8.65	7.15	4.25	3.20

BROAD AXE HANDLES

Price, Broad Axe Handles ..... per dozen **9.85**

ADZE, HOUSE CARPENTER, SHIP AND R. R. HANDLES

Quality		Amer. King	Extra	Exclr.	No. 1	No. 2	No. 3
32, 34 and 36-inch	per dozen	11.65	10.75	9.25	7.60	5.60	4.25

POST MAUL HANDLES

Quality		Extra	Exclr.	No. 1	No. 2
30 and 36-inch	per dozen	8.85	7.65	5.90	4.95

TURNED SLEDGE, TOOL AND MAUL HANDLES

Quality		Amer. King	Extra	No. 1	No. 2	No. 3
24-inch	per dozen	5.45	4.15	3.70	2.30	2.00
26 and 28-inch	"	6.25	5.65	4.25	2.80	2.20
30 " 32 "	"	7.15	6.25	5.05	3.35	2.35
34 " 36 "	"	8.10	7.55	6.00	3.85	2.50
38-inch	"	8.50	7.85	6.20	4.15	3.50
40 "	"	9.50	8.45	6.65	4.95	4.30
42 "	"	10.50	9.05	7.05	5.55	4.90

TURNED HICKORY PICK HANDLES

SURFACE OR R. R. MATTOCK AND MINERS'

Quality		Amer. King	Extra	Exclr.	No. 1	No. 2	A
Surface or R. R., 36-inch	per dozen	12.65	11.80	9.30	8.35	6.65	5.55
Drifting, 32, 34 and 36-inch	"	10.25	9.65	7.15	6.55	5.45	5.05
Poll, 32, 34 and 36-inch	"	10.25	9.65	7.15	6.55	5.45	5.05
Coal Miner's, Small Eye 3x5/8, 34-inch	per dozen	8.95	8.55	6.45	4.85	3.85	....
Coal Miner's, Medium Eye 3x3/4, 34-inch	per dozen	8.95	8.55	6.45	4.85	3.85	....
Coal Miner's, Large Eye 3 1/8x7/8, 34-inch	per dozen	8.95	8.55	6.45	4.85	3.85	....
Grub Hoe Handles, 36-inch	"	12.65	11.80	9.30	8.35	6.65	5.55

HANDLES

AMERICAN KING QUALITY TURNED HAMMER AND HATCHET HANDLES

Size ..... inches	12	13	14	15	16	17
Hatchet, Shingling ..... per dozen	2.45	2.45	2.45	2.45	....	....
" Bd. or Bench ... "	....	....	....	....	2.75	3.55
Machinists' Hammer .... "	2.45	2.45	2.45	2.45	2.65	2.95
Mason Rivet " .... "	2.45	2.45	2.45	2.45	2.65	2.95
A. E. Carpt. " .... "	2.45	2.45	2.45	2.45	2.65	....

Size ..... inches	18	19	20	22	24	....
Hatchet, Shingling ..... per dozen	....	....	....	....	....	....
" Bd. or Bench ... "	3.55	3.95	4.25	....	....	....
Machinists' Hammer .... "	2.95	3.35	3.35	4.25	5.45	....
Mason Rivet " .... "	2.95	3.35	3.35	4.25	5.45	....
A. E. Carpt. " .... "	....	....	....	....	....	....

EXTRA QUALITY TURNED HAMMER AND HATCHET HANDLES

Size ..... inches	12	13	14	15	16	17
Hatchet, Shingling ..... per dozen	....	....	....	....	....	....
" Bd. or Bench ... "	1.90	1.90	1.90	1.90	2.25	2.35
Machinists' Hammer .... "	1.90	1.90	1.90	1.90	2.15	2.15
Mason Rivet " .... "	1.90	1.90	1.90	1.90	2.15	2.15
A. E. Carpt. " .... "	1.90	1.90	1.90	1.90	2.15	2.15

Size ..... inches	18	19	20	22	24	....
Hatchet, Shingling ..... per dozen	....	....	....	....	....	....
" Bd. or Bench ... "	2.65	3.40	3.40	....	....	....
Machinists' Hammer .... "	2.40	2.70	2.70	2.95	3.40	....
Mason Rivet " .... "	2.40	2.70	2.70	2.95	3.40	....
A. E. Carpt. " .... "	2.40	2.70	2.70	2.95	3.40	....

No. 1 QUALITY TURNED HAMMER AND HATCHET HANDLES

Size ..... inches	12	13	14	15	16	17
Hatchet, Shingling ..... per dozen	1.35	1.35	1.35	1.35	1.55	1.75
" Bd. or Bench ... "	1.35	1.35	1.35	1.35	1.55	1.75
Machinists' Hammer ..... "	1.35	1.35	1.35	1.35	1.40	1.55
Mason Rivet " .... "	1.35	1.35	1.35	1.35	1.40	1.55
A. E. Carpt. " .... "	1.35	1.35	1.35	1.35	1.40	1.55

Size ..... inches	18	19	20	22	24	....
Hatchet, Shingling ..... per dozen	2.05	2.25	2.45	....	....	....
" Bd. or Bench ... "	2.05	2.25	2.45	....	....	....
Machinists' Hammer .... "	1.55	1.85	1.85	2.05	2.30	....
Mason Rivet " .... "	1.55	1.85	1.85	2.05	2.30	....
A. E. Carpt. " .... "	1.55	1.85	1.85	2.05	2.30	....

CAMP, HUNTER AND DERRICK HATCHETS

Quality	American King	Extra	No. 1
Derrick Hatchet, 17 and 18-inch ..... per dozen	3.80	3.15	2.30
Camp or Boy Scout Axe, 13, 14 and 15-inch ..... "	2.65	2.15	1.60
" " " " " 16-inch ..... "	2.95	2.45	1.85
Hunter Hatchet, 13, 14 and 15-inch ..... "	2.65	2.15	1.60
" " 16-inch ..... "	2.85	2.30	1.85
" " 17 and 18-inch ..... "	3.80	2.15	2.30
" " 19 " 20 " ..... "	4.35	3.70	2.75

ANVILS AND SWAGE BLOCKS

NATIONAL VULCAN ANVILS

TOOL STEEL FACE

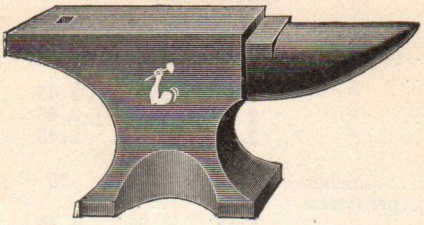


Fig. 23570A

Number	1	2	3	4	5	6	7	8
Weight ....pounds	15	20	30	40	50	60	70	80
Price ....each	**3.25**	**4.00**	**4.50**	**5.25**	**6.00**	**6.50**	**7.25**	**8.00**
Number	9	10	11	12	13	14	15	....
Weight ....pounds	90	100	110	120	130	140	150	....
Price ....each	**9.00**	**10.00**	**11.00**	**12.00**	**13.00**	**14.00**	**15.00**	.....

COLUMBIAN ALL STEEL WELDLESS ANVILS

Price,	80 to 425	Lbs...	per lb.	Base	Price,	50 to 59	Lbs.....	per lb.	**2c**	extra
"	426 " 625	" ...	"	**½c** extra	"	40 " 49	"	"	**3c**	"
"	626 " 800	" ...	"	**1 c** "	"	30 " 39	"	"	**5c**	"
"	70 " 79	" ...	"	**½c** "	"	20 " 29	"	"	**8c**	"
"	60 " 69	" ...	"	**1 c** "	"	10 " 19	"	"	**15c**	"

SOLID WROUGHT STEEL FACE ANVILS

PETER WRIGHT

Price,	80 to 349	Pounds	per pound	Base
"	350 " 600	"	"	**½c** extra

TRENTON

Price,	80 to 349	Pounds	per pound	Base
"	350 " 600	"	Advance "	**½c**

CAST IRON SWAGE BLOCKS

Nos. 1½, 2½ AND 3½

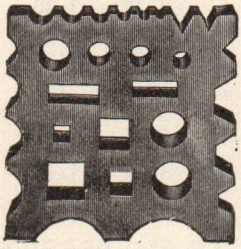


Fig. 23570B

Number....	0	0½	1	1½	2	2¼
Size .....in.	4x14x19½	4x15x15	3¾x10x14	4x12½x12½	3⅞x11⅛x14⅞	4⅛x13¾x13¾
Weight ..lbs.	170	123	106	100	126	135
Price.per lb.	....	....	....	....	....	....
Number....	2½	3	3½	4	4½	5
Size .....in.	4x14⅞x14⅞	4⅜x11⅛x15	4⅜x16x16	4x15x15	4⅜x18x18	6x24x24
Weight..lbs.	148	143	198	164	255	675
Price.per lb.	....	....	....	....	....	....

ANVIL TOOLS

SWAGES — TOP, BOTTOM — SQUARE FLATTER

Fig. 4311A

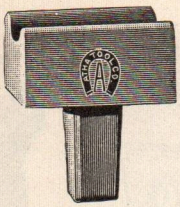


Fig. 4311B

Fig. 4311C

SWAGES

For shaping, sizing and smoothing round forgings. The size given is the diameter of round bar to which the swage will finish.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
1/4	.75	7/8	1.00	2	1.45
3/8	.75	1	1.00	2 1/2	1.75
1/2	.75	1 1/4	1.15	3	1.95
5/8	.85	1 1/2	1.30	...	....
3/4	1.00	1 3/4	1.45	...	....

SQUARE FLATTERS

For smoothing and finishing flat forgings. No bottom tool is required, the anvil serving as such.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
1 1/2	.75	2 3/4	1.35	4	3.00
2	.90	3	1.50	...	....
2 1/2	1.20	3 1/2	2.10	...	....

HARDIE — ROUND PUNCH

Fig. 4311D

Fig. 4311E

HARDIES

To set in anvil and for cutting off forgings. Size given is size of shank.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
5/8	.40	7/8	.55	1 1/8	.75
3/4	.45	1	.60	1 1/4	.85

ROUND PUNCHES

1/4	.60	5/8	.75	1	1.05
3/8	.60	3/4	.85	...	....
1/2	.60	7/8	.90	...	....

FULLERS — TOP, BOTTOM — HEADING TOOL

Fig. 4311F

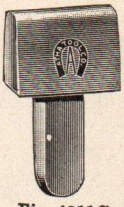


Fig. 4311G

Fig. 4311H

FULLERS

For necking and grooving forgings, and also for drawing down a forging to a smaller section. The length of the working edge varies from 2 1/2 inches to 3 1/2 inches.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
1/4	.75	3/4	.85	1 1/2	1.20
3/8	.85	7/8	1.00	1 3/4	1.30
1/2	.85	1	1.00	2	1.45
5/8	.85	1 1/4	1.05	...	....

HEADING TOOLS

For holding bolts while forming the head. The size given is the diameter of the hole.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
3/8	1.00	5/8	1.30	7/8	1.50
1/2	1.00	3/4	1.30	1	1.50

SET HAMMER — CHISELS: COLD, HOT

Fig. 4311J

Fig. 4311K

Fig. 4311L

SET HAMMERS

For setting down metal in a forging.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
1	.60	1 1/2	1.00	2	1.50
1 1/4	.75	1 5/8	1.05	...	....

COLD AND HOT CHISELS

1	.45	1 1/4	.60	1 1/2	.90
1 1/8	.55	1 3/8	.75	...	....

ROCK DRILL SHARPENING TOOLS

No. 1
BOTTOM SPREADER

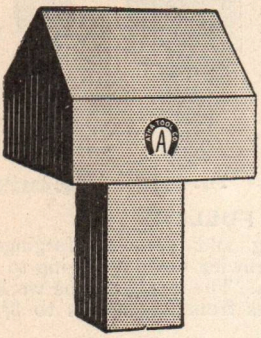


Fig. 30351A

No. 2
DOLLY

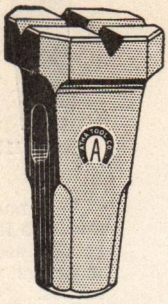


Fig. 30351B

No. 3 HIGH
CENTER DOLLY

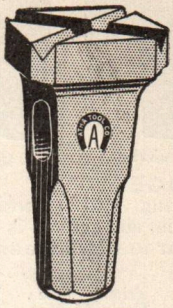


Fig. 30351C

No. 4
¼ DOLLY

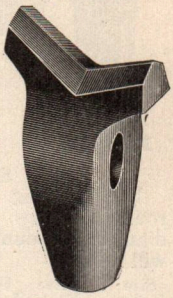


Fig. 30351D

No. 5 SET
HAMMER

Fig. 30351E

No. 6 TOP SPREADER

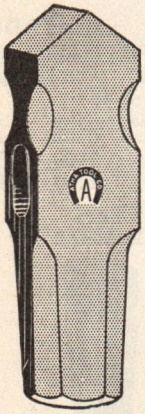


Fig. 30351F

No. 7 SOW

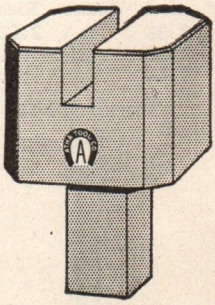


Fig. 30351G

No. 8
DOLLY

Fig. 30351H

No.	Name	Standard Tools *Weight Pounds	Standard Tools Price Each	Baby Tools *Weight Pounds	Baby Tools Price Each
1	Bottom Spreader	3½	**1.40**	...	....
2	Dolly	7	**2.75**	2¾	**1.50**
3	High Center Dolly	...	....	2¾	**2.00**
4	¼ Dolly	...	....	1¾	**2.00**
5	Set Hammer	3¾	**1.45**	...	....
6	Top Spreader	4	**1.55**	...	....
7	Sow	6¾	**2.65**	3½	**1.90**
8	Dolly for Either four or 6-point bits	2½	**3.00**	...	....

*Weights given are approximate.

BLACKSMITHS' AND FARRIERS' TOOLS

LACKSMITH'S APRON

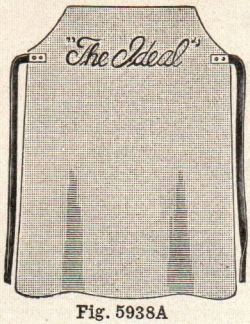


Fig. 5938A

MOLDER'S BELLOWS

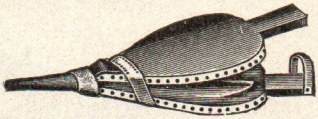


Fig. 5938B

FARRIER'S KNIFE

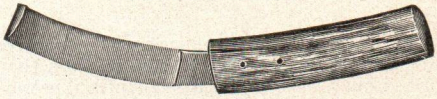


Fig. 5938C

BLACKSMITHS' APRONS, WITHOUT BIBBS

Number	1	2	3	4	5	6
Size ....inches	25x29	26x31	27x33	28x35	29x37	32x38
Price....per dozen	18.00	19.50	21.00	22.50	24.00	27.00

BLACKSMITHS' APRONS, WITH BIBBS

Size ....inches	26x34	27x36	28x38	29x40	30x42	33x43
Price....per dozen	19.50	21.00	22.50	24.00	25.50	28.50

EXTRA HEAVY APRONS, FOR HORSESHOERS' FLOORMEN

Price, Size 27x32 inches ....per dozen	30.00

MOLDERS' BELLOWS

Width....inches	8	10	12
Price....per dozen	13.50	17.50	24.00

FARRIERS' KNIVES

Price, Bone Handle, 5/8 and 3/4-inch Blade ....per dozen	6.00

HORSESHOE NAILS

Regular and Frost Heads

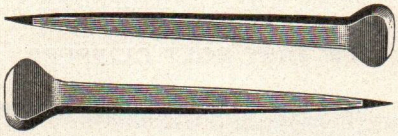


Fig. 5938D

CAPEWELL

Number	2	3	4	4½	5	6	7	8	9	10	11	12
Price ....per pound	1.50	.75	.35	.30	.22	.19	.18	.17	.16	.16	.15	.15
" ....per box	37.50	18.75	8.75	7.50	5.50	4.75	4.50	4.25	4.00	4.00	3.75	3.75

In boxes of 5 or 25 pounds each, either size. Made in all sizes and styles of head, corrugated blade, countersunk head, ice, good-enough, city and regular head.

NEW ANCHOR

Number	5	6	7	8	9
Price ....per pound	....	....	....	....	....

PORTER'S BOLT CLIPPERS

NEW O. K. BOLT CUTTERS

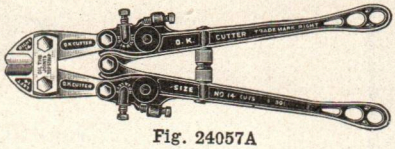


Fig. 24057A

The O. K. Cutters are made with utmost care. All parts are interchangeable. There is ample adjustment to take up the wear on the cutting edges. They may be had with two styles of jaws, clipper cut as shown in illustration, with large bevel on top side, and small bevel on bottom side, for trimming bolts and rivets and other work requiring a nearly flat end; or secondly, center cut, in which the bevels are equal and the cutting edge is in the center of the thickness of the jaw.

Number		10	14
Length	inches	10	14
Capacity, with Clipper Cut Jaws for Annealed Bolts in the Thread	"	3/16	1/4
" " Center " " " Soft Rods	"	3/16	1/4
Weight	pounds	1½	2 5/16
Price	each	...	...

EASY BOLT CLIPPERS

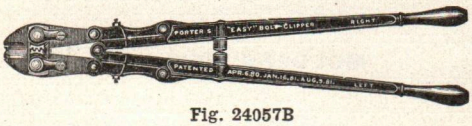


Fig. 24057B

Number		1	2
For Annealed Bolts in the Thread	inches	3/8	1/2
Length	"	24	30
Weight	pounds	4½	7⅘
Price	each	**5.00**	**7.00**

Adjusted by shims. Adjusting shims and wrench packed with each clipper.

NEW EASY BOLT CLIPPERS

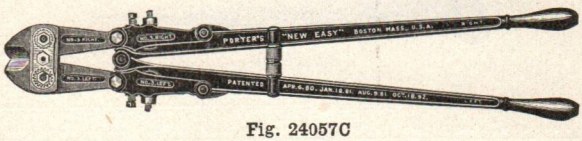


Fig. 24057C

Number		0	1	2	3
For Annealed Bolts in the Thread	inches	5/16	3/8	1/2	5/8
Length	"	18	24½	30	36
Weight	pounds	3	5¾	9	13
Price	each	**3.75**	**5.00**	**7.00**	**9.00**

Nos. 0 and 1 have open handle grips. Nos. 2 and 3 have solid grips. Adjusted by set screw. No special wrench or shims required.

BOLT CLIPPER REPAIRS

NEW EASY

PARTS OF HEAD

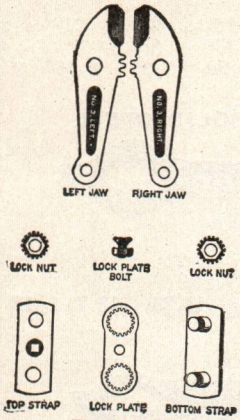


Fig. 13805A

PARTS OF HANDLE

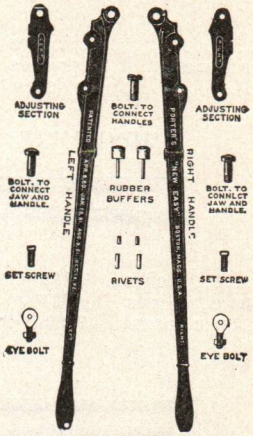


Fig. 13805B

Style	Easy		New Easy			
Number	1	2	0	1	2	3
Cutter Head, Complete ... each	2.85	3.95	2.10	2.70	3.70	4.65
Cutting Jaws ... per pair	1.65	2.35	1.35	1.65	2.35	3.00
One Cutting Jaw ... each	.83	1.18	.68	.83	1.18	1.50
Bottom Strap with Two Steel Bolts ... "	.50	.60	.40	.50	.60	.70
Top " ... "	.20	.30	.10	.20	.30	.40
Locknuts ... per pair	.15	.20	.10	.15	.20	.25
Wrench for Locknuts ... each	.15	.20	....	....	....	....
Lock Plate for Nuts ... "	.15	.20	.10	.15	.20	.25
" " Bolt ... "	....	....	.05	.05	.05	.05
Equalizing Gears ... per pair	.10	.15	....	....	....	....
Bolt for Equalizing Gear ... each	.10	.15	....	....	....	....
Handles, Complete ... per pair	1.80	2.60	1.90	2.30	3.30	4.35
One Handle, Complete ... each	.90	1.30	.95	1.15	1.65	2.20
" " without Parts ... "	.53	.80	.40	.50	.90	1.35
Adjusting Sections ... "	.30	.35	.25	.30	.35	.40
" Shims ... per bunch	.20	.25	....	....	....	....
" Screws ... per pair	....	....	.10	.12	.14	.16
Rubber Buffers with Rivets and Washers "	.25	.30	.20	.25	.30	.35
Rivets for Handles ... per dozen	.20	.25	....	....	....	....
Bolts, to Connect Jaws and Handles ... per pair	.12	.14	.10	.12	.14	.16
" " " Handles ... each	.06	.07	.05	.06	.07	.08
Eyebolts, with Nuts and Rivets ... per pair	....	....	.20	.25	.30	.35

In ordering jaws, handles, adjusting sections and connecting bolts state whether right or left are wanted.

BLACKSMITHS' TONGS

HORSESHOERS' STRAIGHT LIP

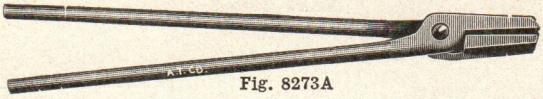


Fig. 8273A

Length.....inches	14	16	18	20	22	24	30
Weight, per Dozen.....pounds	27	30	33	35	38	40	48
Price.....per dozen	**6.90**	**7.20**	**7.50**	**7.95**	**8.55**	**9.60**	**11.40**

CURVED LIP, FLUTED JAW, SOLID STEEL

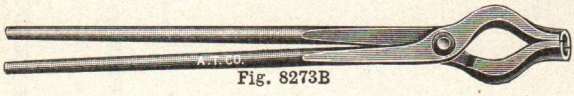


Fig. 8273B

Length.....inches	18	20	20	22	22	24	24	26
Weight, per Dozen...pounds	32	34	34	37	37	39	39	42
Price .....per dozen	**9.00**	**9.75**	**9.75**	**11.25**	**11.25**	**12.75**	**12.75**	**14.25**

SINGLE PICK-UP

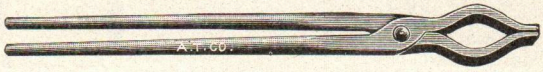


Fig. 8273C

DOUBLE PICK-UP

Fig. 8273D

Length.....inches	20	22	24
Weight, per Dozen.....pounds	33	36	38
Price.....per dozen	**12.75**	**13.50**	**15.00**

RIVET

Fig. 8273E

Length.....inches	18	24
Weight, per Dozen.....pound	31	38
Price.....per dozen	**24.00**	**30.00**

GAD

Fig. 8273F

Length.....inches	20
Weight, per Dozen.....pounds	33
Price.....per dozen	**9.75**

TUYERES AND BLAST GATES

ROYAL TUYERE

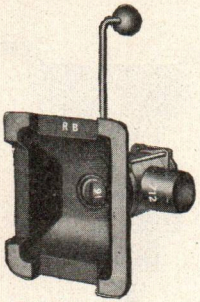


Fig. 23734A

MAMMOTH TUYERE

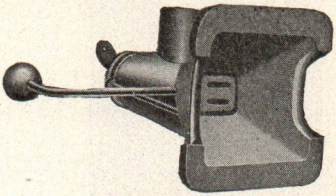


Fig. 23734B

ROYAL TUYERES

The Royal Tuyere has a large, heavy, solid iron fire pot, with side and center blast tuyere ball. Measures 8x9½x4 inches inside. Weight, 50 pounds. Diameter of inlet, 3 inches. It needs no clay.

This is furnished regularly with all Royal Blowers.

Price.....each **14.00**

MAMMOTH TUYERES

Has square ball, furnishing side and center blast. Extra large. Size, inside, 9x11½ inches, 4 inches deep. Weight, 55 pounds. Diameter of inlet, 3 inches. No clay required.

This tuyere will be furnished with Royal Blowers, no extra charge, if requested.

Price.....each **14.00**

WESTERN CHIEF TUYERE

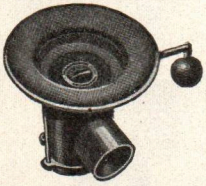


Fig. 23734C

WESTERN CHIEF BLAST GATE

Fig. 23734D

WESTERN CHIEF TUYERES

This tuyere has a loose ring top which rests on clay, to prevent falling or crumbling. Weight, 40 pounds. Diameter of inlet, 3 inches.

Price.....each **9.00**

WESTERN CHIEF CAST IRON BLAST GATES

Outside Diam. Inches	Weight Pounds	Price Each	Outside Diam. Inches	Weight Pounds	Price Each
2½	3	**2.50**	5	11	**4.00**
3	5	**3.00**	6	15	**4.50**
4	6	**3.50**	7½	18½	**5.50**
4½	9½	**3.75**	8	23	**6.50**

BUFFALO VULCAN TUYERE

IN OPERATION

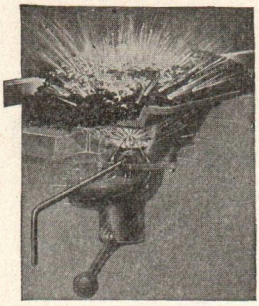


Fig. 4878A

SECTIONAL VIEW, No. 1

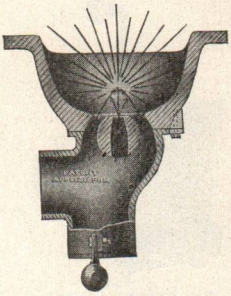


Fig. 4878B

The patented eccentric blast valve in this tuyere is a new invention of inestimable value to the blacksmith. The rising and falling action of this valve gives as large and as small a fire as desired, and affords a large clearance for ashes and clinkers. The fire pot is deep and heavily re-enforced with metal to insure against burning out. The fire pot is detachable from the base, so that it may be replaced at a small expense and without buying a complete new tuyere. The ash gate is hinged and balanced so that it opens and closes almost automatically. Size, 12½x14x4½ inches.

The blast is forced into the fire pot through three tapering converging channels (see sectional view, No. 1). The currents collide at high speed, and the blast is scattered all through the coal bed as if from an explosion. The result is a large, deep, intense fire, giving the cleanest, strongest welds because of the high blast pressure.

SECTIONAL VIEW, No. 2

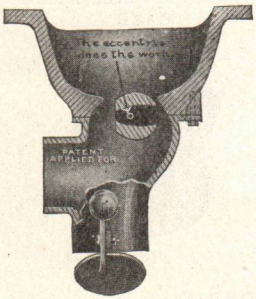


Fig. 4878C

SECTIONAL VIEW, No. 3

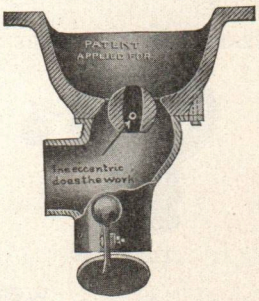


Fig. 4878D

A quarter turn of rod brings the eccentric rod into above position (see sectional view, No. 2), giving a small fire at either side of the fire pot, suitable for lighter work. Also note the exceptionally wide clearance for ashes and clinkers when valve is in this position.

Another slight turn of valve (see sectional view, No. 3), practically closes the side blast channels, so that blast is delivered through the center of valve only, for a small fire in the middle of fire pot.

Price, as described above	each	6.00

Approximate weight, 60 pounds.

FORGES

No. 5 WESTERN CHIEF FORGES

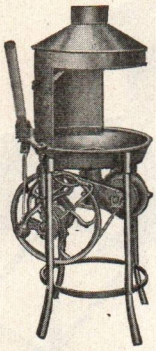


Fig. 23945A

For toolmakers, bicycle repair shops, jewelers, dentists, tin shops, farmers, etc. Capacity to heat 2¼-inch iron. Brass boxes and oil cups throughout, also noiseless adjustable friction clutch.

Blower, 9 inches; hearth, 22 inches; height, 33 inches; weight, 125 pounds.

Price.....each **36.00**

No. 11 LEADER FORGES

Fig. 23945B

The No. 11 Leader Forge is strongly built, carefully tested and highly reliable. Suitable for light outdoor work. Capacity to heat 1-inch iron.

Blower, 7½ inches; hearth, 18 inches; height, 30 inches; weight, 65 pounds.

Price.....each **17.00**

No. 151 CHICAGO FORGES

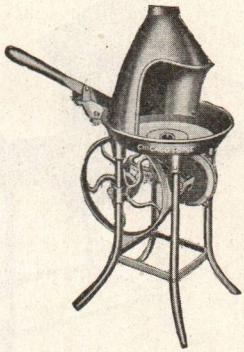


Fig. 23945C

The No. 151 Chicago Forge is suitable for farmers, small shops, toolmakers, etc. It has a half-hood for indoor use. An inexpensive forge and well made.

Blower, 8 inches; hearth, 18 inches; height, 30 inches; weight, 85 pounds.

Price.....each **19.00**

No. 154 CHICAGO FORGES

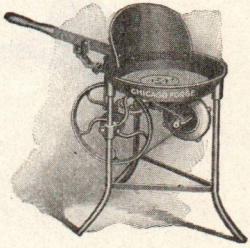


Fig. 23945D

A very good outdoor forge for use on ranches, farms, at mines, quarries, etc., where expensive equipment is not a necessity.

Blower, 8¾ inches; hearth, 22 inches; height, 30 inches, weight, 85 pounds.

Price.....each **19.00**

BUFFALO FORGES

HAND FORGES

No. 240H

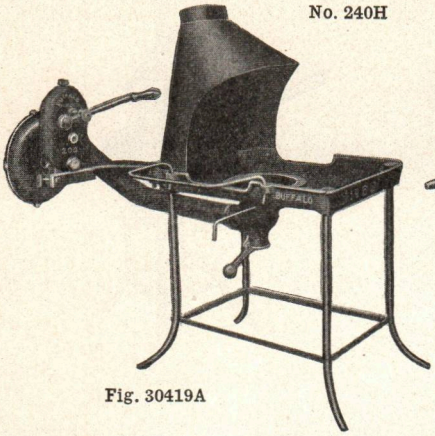


Fig. 30419A

No. 243E

Fig. 30419B

Number		243E
Size of Hearth	inches	28x40
" " Blower	"	14
Blast Pressure	"	.....
Speed of Fan	r. p. m.	.....
Shipping Weight	pounds	500
Price, with Water Tank	each	**79.00**
" without Water Tank	"	**75.00**

No. 232H

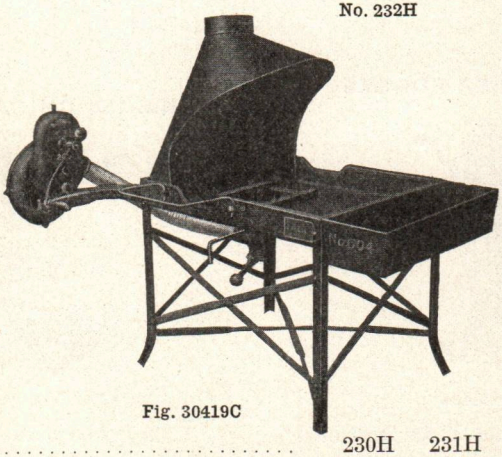


Fig. 30419C

Number		230H	231H	232H	233H
Diameter of Fan	inches	14	14	14	14
Blast Pressure	"	.....	3	3	3
Speed of Fan	r. p. m.	.....	2200	2200	2200
Size of Hearth	inches	24x24	30x30	30x36	30x40
Shipping Weight	pounds	230	270	310	330
Price, with Water Tank	each	**55.00**	**65.00**	**70.00**	**75.00**
" without Water Tank	"	**50.00**	**60.00**	**65.00**	**70.00**

BUFFALO FORGES

No. 243H BUFFALO FORGES

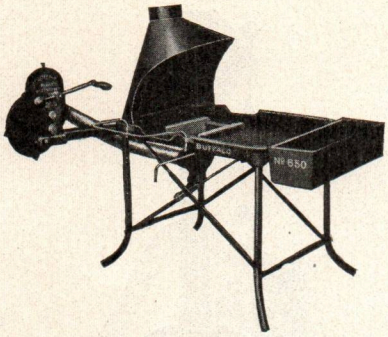


Fig. 23635A

This forge is especially adapted to the needs of the general blacksmiths. It has sufficient capacity for doing the heaviest work in the shortest time, at the same time affording easy regulation for a smaller fire.

When it is desired to clean out the fire pot, poke the coal bed a little, while turning the valve rod; the rotating valve then quickly crushes and cleans out the clinkers and ashes, the clearance being exceptionally good.

It is equipped with a balanced ash gate which opens and closes almost automatically, making the dumping of ashes especially convenient.

The pressures given below for the different size fans are not the maximum, but are obtained with 2200 revolutions of the fan per minute, which corresponds to an ordinary, easy crank motion.

Fan.....inches	12	14	16
Blast Pressure. "	2½	3	4
Hearth..... "	28x40	28x40	28x40
Weight.....pounds	348	350	355
Price, with Water Tank.....each	**52.00**	**54.00**	**59.00**
Price, without Water Tank.....each	**48.00**	**50.00**	**55.00**

14-inch fan is recommended.

No. 210 BUFFALO RIVET FORGES

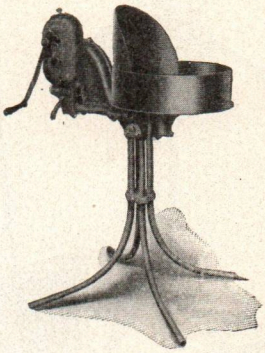


Fig. 23635B

Equipped with No. 200 silent blower, with 12-inch fan. The fire pan is made of heavy rolled steel plates, strongly riveted.

No.....	210	211	212
Diam. of Fire Pan.....in.	18	22	24
Weight.....pounds	115	120	130
Price.....each	**35.00**	**38.00**	**41.00**

No. 161 BUFFALO AGRICULTURAL FORGES

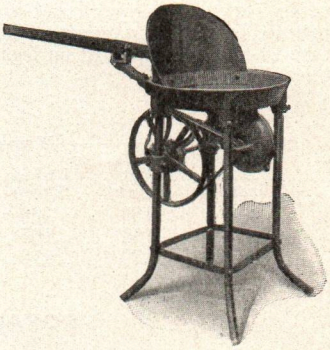


Fig. 23635C

Well constructed, with deep and strong hearth, and lever-operated 8-inch steel fan.

No.....	161	161H
Diam. of Hearth.....inches	18	18
Type Hood.....	Shield	Half Hood
Weight.....pounds	70	75
Price.....each	**14.00**	**16.00**

BLOWERS

No. 200 BUFFALO SILENT BLOWER

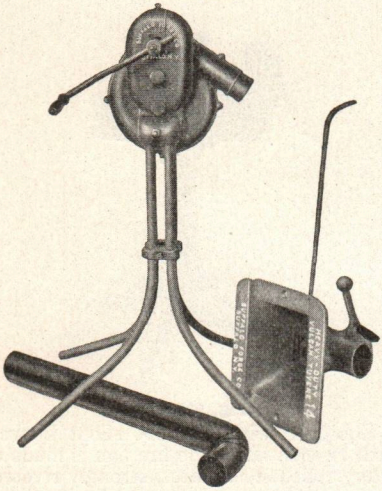


Fig. 30414A

ROYAL BLOWER

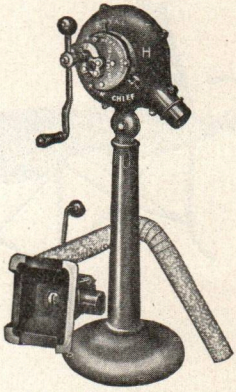


Fig. 30414B

No. 200 BUFFALO SILENT BLOWERS

Has dust and leak-proof one-piece gear case. High speed pinion runs in bath of oil, lubricating all other working parts by splashing. The 14-inch fan gives 22 per cent higher blast pressure than any 12-inch blower with the same power expended. Think what this means—easier work, quicker work and stronger welds, because scaling or oxidation of the iron is prevented by the high pressure. The 16-inch fan gives 63 per cent higher blast pressure than the 14-inch. Furnished on legs as illustrated, or on pedestal to fasten to floor, known as No. 200P.

Diam. of Fan Case Inches	Blast Pressure at 2200 R. P. M. Inches	Weight, Pounds — On Legs — With Tuyere	On Legs — Without Tuyere	On Pedestal — With Tuyere	On Pedestal — Without Tuyere	Price, Each — Either Style — With Tuyere and Pipe	Price, Each — Either Style — Without Tuyere or Pipe
12	2½	160	100	193	138	**37.00**	**35.00**
14	3	165	105	195	140	**44.00**	**42.00**
16	4	170	110	197	142	**48.00**	**46.00**

ROYAL BLOWERS

Crank turns forward or backward. Noiseless and easy to operate. Gear case is oil-tight and dustproof. Gears run in a continuous bath of oil. Gears are flat and straight cut, made of special materials. No spiral or worm gears. A powerful blast; lasting after-blast.

Blower, 12 inches; height, 47 inches; fire pot, 8x9½ inches, inside. Net weight, 135 pounds.

Price, Complete as Shown.....each **52.00**
" without Tuyere..... " **46.00**
" " Stand, but with Tuyere..... " **48.00**

FORGES

No. 76 ROYAL STEEL FORGES

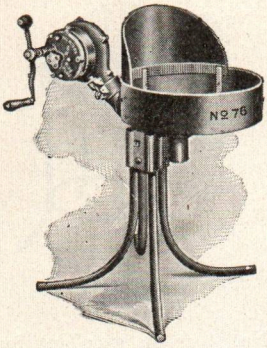


Fig. 23337A

For riveters, boilermakers, mines, quarries, etc.

Crank turns forward or backward. Capacity to heat 3½-inch iron. Blower, 9 inches; hearth, 18 inches; height, 30 inches; weight, 85 pounds.

Price.....each **49.00**

No. 102 ROYAL WESTERN CHIEF FORGES

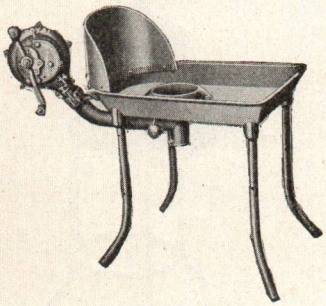


Fig. 23337B

For well-drillers, railroads, boiler-makers, quarries, contractors, outdoor work, etc. Crank turns forward or backward. Capacity to heat 3½ inch iron. Equipped with Royal type of blower and duck nest fire pot. Blower, 10 inches; hearth, 23x34 inches; height, 30 inches; weight, 180 pounds.

Price .....each **64.00**

No. 100 ROYAL WESTERN CHIEF FORGES

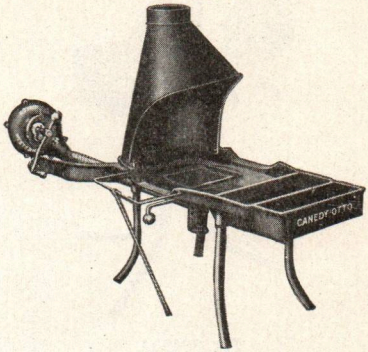


Fig. 23337C

Adapted for large blacksmith, wagon, plow, railroad shops, etc. Capacity to heat 4-inch iron. Blower, 12 inches; hearth, 31½x45½ inches; height, 30 inches; length over all, 53 inches. Weight, with one tank, 295 pounds; with extra tank, 325 pounds.

Price, with One Tank.....each **83.00**
" " Extra Tank..... " **92.00**

Always shipped without extra tank, unless otherwise ordered.

No. 103 ROYAL WESTERN CHIEF FORGES

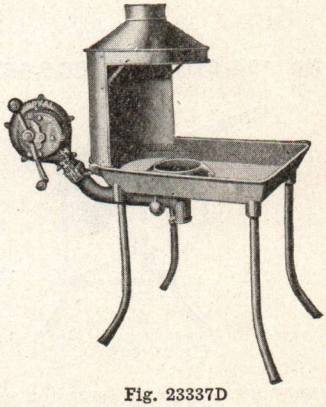


Fig. 23337D

For horseshoers, small blacksmith shops, garages, boilermakers, etc. Capacity to heat 3½-inch iron. Blower, 10 inches; hearth, 23x24 inches; height, 30 inches; weight, 185 pounds.

Price.....each **70.00**

FORGES

No. 510 BUFFALO FORGES

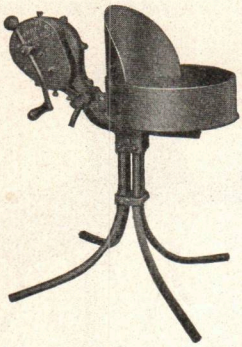


Fig. 30420A

The No. 510 has a heavy round steel plate fire pan, securely riveted and mounted on four ¾-inch steel pipe legs.

A round tuyere plate distributes the heat so as to insure the best results in heating. Can be furnished with windshield.

Equipped with No. 500 ball-bearing blower. Gear ratio 47½ to 1.

No.	Diam. of Fire Pan Inches	Diam. of Fan Case Inches	Weight Pounds	Price Each
510	19	12	110	**32.00**
511	22	12	120	**35.00**
512	24	12	130	**38.00**

No. 154 CHICAGO FORGES

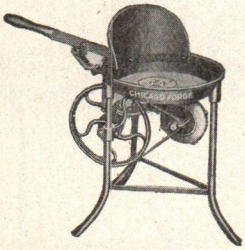


Fig. 30420B

A very good outdoor forge for use on ranches, farms, at mines, quarries, etc., where expensive equipment is not a necessity.

Blower, 8¾ inches; Hearth, 22 inches; height, 30 inches; weight, 85 pounds.

Price.....each **19.00**

No. 104 ROYAL WESTERN CHIEF FORGES

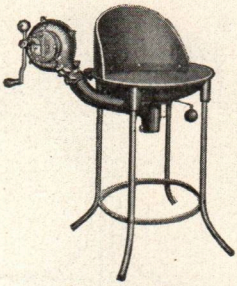


Fig. 30420C

The No. 4 is an excellent forge for mines, quarries, bridge builders, railroad and outdoor repair or construction work. It is one of the most serviceable forges constructed for outdoor use. Crank turns forward or backward. Capacity to heat 3½-inch iron. Blower, 10 inches; hearth, 22 inches; height, 33 inches; weight, 120 pounds.

Price.....each **52.00**

No. 105 ROYAL WESTERN CHIEF FORGES

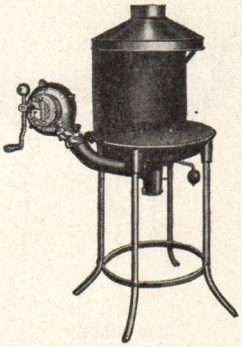


Fig. 30420D

The No. 105 Royal Western Chief Forge is adapted for tool makers, jewelers, dentists, tin shops, repair shops, garages, etc. The crank turns forward or backward. Capacity to heat 3½-inch iron. Blower, 10 inches; hearth, 22 inches; height, 33 inches; weight, 125 pounds.

Price.....each **55.00**

BUFFALO BLOWERS

B VOLUME BLOWERS

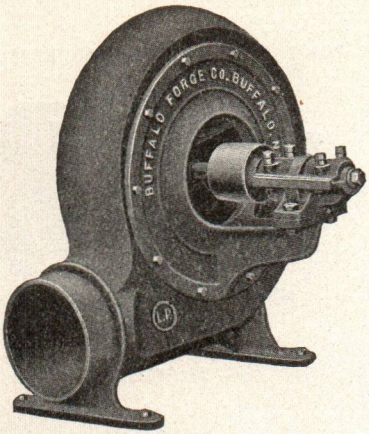


Fig. 8109A

The oil-ring bearings used in these blowers are thoroughly dust-proof, self-oiling and of ample proportions to keep wear and heating at a minimum, and enable blowers to run without attention for weeks. The solid peripheral shell prevents all possibility of leakage and insures permanent alignment of bearings.

	Price, Each				
No.	Bottom Horizontal Regular B. & E. only	Counter-shaft	Extra Tight and Loose Pulleys	With Adjustable Bed	With Adjust. Base and Counter-shaft
000	23.00	17.00	7.50	.....	.....
1	30.00	20.00	9.00	.....	.....
2	38.00	27.00	10.00	.....	.....
3	54.00	34.00	11.50	.....	.....
4	66.00	42.00	12.50	.....	.....
5	83.00	50.00	13.50	150.00	230.00
6	105.00	67.00	15.00	190.00	300.00
7	135.00	84.00	17.00	250.00	390.00
8	225.00	108.00	22.00	390.00	590.00
9	300.00	133.00	23.50	565.00	840.00
10	375.00	142.00	28.50	700.00	1050.00
11	525.00	150.00	35.00	800.00	1175.00

Discharges other than bottom horizontal, 10 per cent extra.

Furnished as exhausters at same price when specified.

STEEL PRESSURE BLOWERS

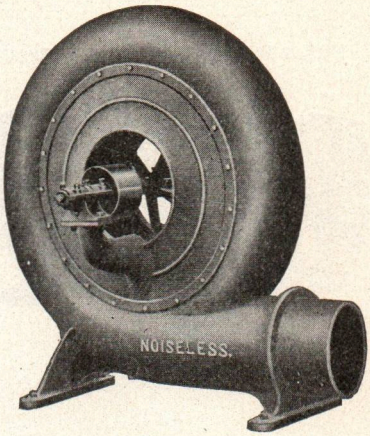


Fig. 8109B

Revolved by the rotation of the shaft, rings convey the oil to the shaft, from which it is distributed full length of the bearing by means of specially designed oil grooves. By this method a positive feed is obtained, and as the oil supply is increased with the speed of the shaft, it is impossible for the latter to heat.

	Price, Each				
No.	Bottom Horizontal Discharge	Counter-shaft	Extra Tight and Loose Pulleys	With Adjustable Base	Extra for Loose Pulleys
1	18.00	14.00	7.00	.....	.....
2	27.00	17.00	7.50	.....	.....
3	39.00	20.00	9.00	.....	.....
4	54.00	27.00	10.00	.....	.....
5	66.00	34.00	11.50	.....	.....
6	83.00	42.00	12.50	133.00	42.00
7	105.00	59.00	13.50	150.00	59.00
8	135.00	75.00	15.00	190.00	75.00
9	175.00	100.00	17.00	250.00	85.00
10	240.00	133.00	20.00	390.00	100.00
11	340.00	150.00	27.00	495.00	125.00
11½	415.00	167.00	35.00	565.00	150.00
12	490.00	184.00	35.00	700.00	167.00

Discharges other than bottom horizontal, 10 per cent extra.

CONNERSVILLE POSITIVE PRESSURE BLOWERS

FOR 1 POUND MAXIMUM PRESSURE

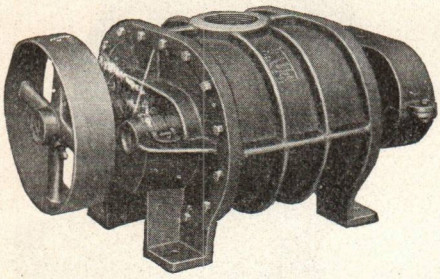


Fig. 5531A

FOR 2½ POUNDS MAXIMUM PRESSURE

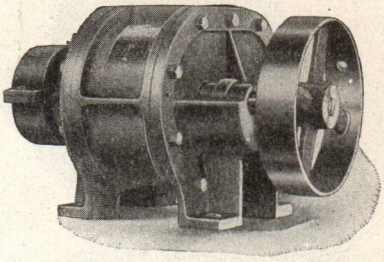


Fig. 5531B

No valves or valve parts, only two moving elements. No light or delicate parts or internal contact or wear, no reciprocating motion or reversals to limit speed.

Balanced at all speeds, minimum vibration. Delivers clean air, no internal oiling required. Four large ring-oiling bearings.

BLOWERS FOR 1 POUND PRESSURE

No.	Cu. Ft. per Rev.	Opening Inches	Max. R.P.M.	Cu. Ft. per Min.	H. P. at 1 Pound	Size Pulley Inches	Shipping Weight Pounds	Price, Each — Single Pulley	Price, Each — T. and L. Pulleys
35	.1	2.5	1000	77	.6	7x1½	100	**45.00**	**48.00**
40	.16	2.5	900	110	.9	8x2	140	**70.00**	**74.00**
50	.316	3	600	150	1.2	10x2½	250	**120.00**	**125.00**
60	.666	*4	400	213	1.4	16x3	540	**250.00**	**259.00**

BLOWERS FOR 2½ POUNDS PRESSURE

17½	.061	2	1000	40	† .9	7x1½	75	**45.00**	**48.00**
20	.089	2	900	52	†1.2	8x2	110	**70.00**	**74.00**
25	.167	2.5	700	83	†1.7	10x2½	170	**120.00**	**125.00**
30	.333	3	500	124	†2.1	16x3	350	**250.00**	**259.00**

*Plain clamping ring for 4-inch sheet metal pipe. All other sizes tapped I. P. size.

†H. P. at 2.5 pounds.

Prices on larger capacities and higher pressures furnished upon application.

BUFFALO BALL-BEARING POST DRILLS

No. 711

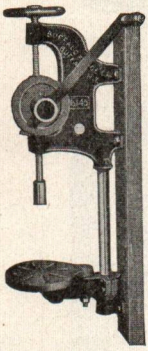


Fig. 9639A

Nos. 611 AND 614

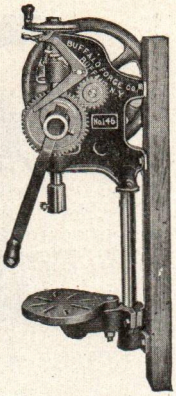


Fig. 9639B

No. 712

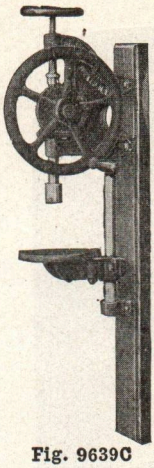


Fig. 9639C

Nos. 612 AND 615

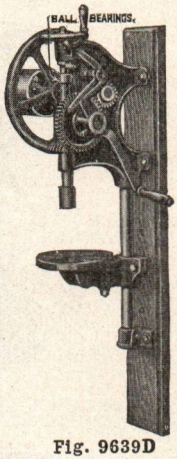


Fig. 9639D

No. 711 has hand feed by means of small wheel on top. No flywheel.

Nos. 611 and 614. These have both hand and automatic feed, and have flywheel.

Number	711	611
Size of Hole Will Drill...in.	¾	¾
Drills to Center of Circle. "	11	11
Run of Feed "	3½	3
" " Table "	9	9
Diameter of Spindle "	⅞	⅞
Bored for "	½	½
Length "	33	33
Weight pounds	58	63
Price each	**6.00**	**7.00**

Number	614
Size of Hole Will Drill...in.	1
Drills to Center of Circle "	14
Run of Feed "	3
" " Table "	12
Diameter of Spindle "	1
Bored for "	½
Length "	41
Weight pounds	96
Price each	**9.00**

No. 712 is similar in design to No. 711 but built a little heavier.

No. 712W has hand feed only. Handle mounted on flywheel.

Nos. 612 and 615. Both hand and automatic feed, the latter adjustable to three feeds.

Number	712	712W
Size of Hole Will Drill..in.	¾	¾
Drills to Center of Circle. "	12	12
Run of Feed "	3½	3½
" " Table "	9	9
Diameter of Spindle "	⅞	⅞
Bored for "	½	½
Length "	33	33
Weight pounds	58	58
Price each	**6.50**	**7.00**

Number	612	615
Size of Hole Will Drill..in.	1	1¼
Drills to Center of Circle. "	12	15
Run of Feed "	3	3¼
" " Table "	9	10½
Diameter of Spindle "	1⅛	1⅛
Bored for "	½	½
Length "	33	38
Weight pounds	65	90
Price each	**8.00**	**10.00**

BUFFALO BALL-BEARING POST DRILLS

No. 124A

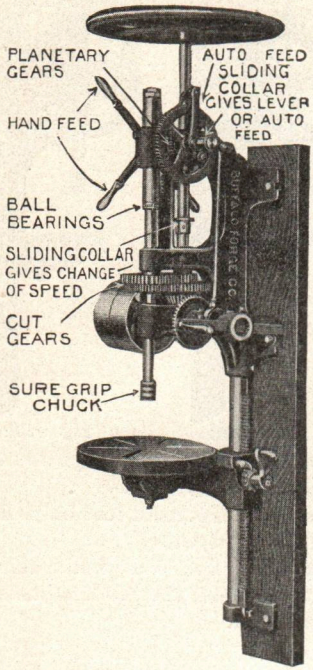


Fig. 7780A

No. 124CA

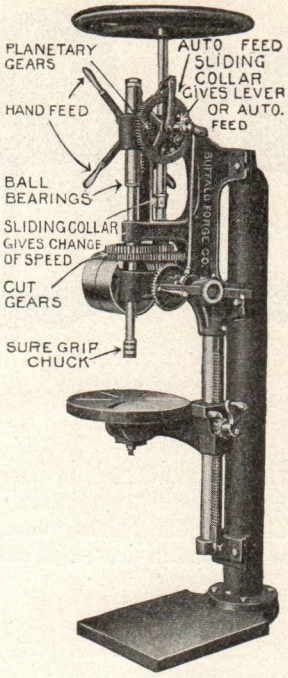


Fig. 7780B

Nos. 124A and 124CA have the planetary gears on the automatic feed. Every gear throughout the drill is cut. Standard Buffalo Ball Bearings, Sure-Grip Chuck, two speeds of spindle. The automatic feed is adjustable to four speeds.

Number		124	124A	124C	124CA
Size of Hole with Drill	inches	1½	1½	1½	1½
Drills to Center of Circle	"	24	24	24	24
Run of Feed	"	7½	7½	8	8
" " Table	"	20	20	20	20
Spindle Bored for	"	**½	**½	**½	**½
Length Over All	"	72	72	78	78
Diameter of Pulley	"	...	3x8	.....	3x8
Weight	pounds	370	390	610	630
Price, for Hand only	each	**50.00**	.....	**62.00**	.....
" " " and †Power	"	.....	**54.00**	.....	**66.00**

†With tight and loose pulleys. **Also furnished for $\frac{41}{64}$-inch or ⅝-inch, without extra charge.

BUFFALO POST DRILLS

No. 421

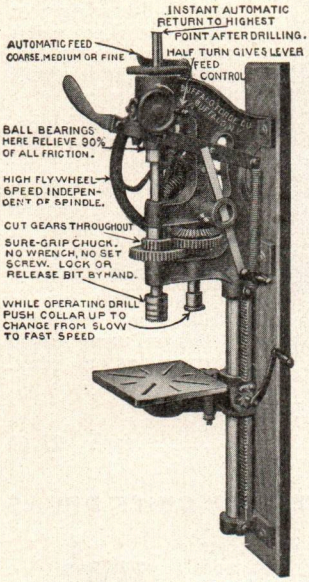


Fig. 6731A

No. 421E

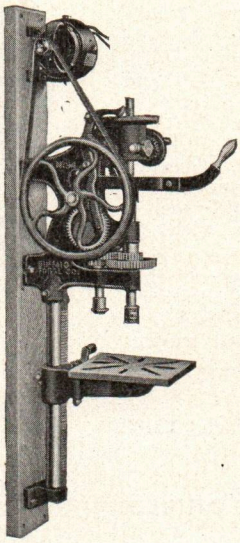


Fig. 6731B

No. 418

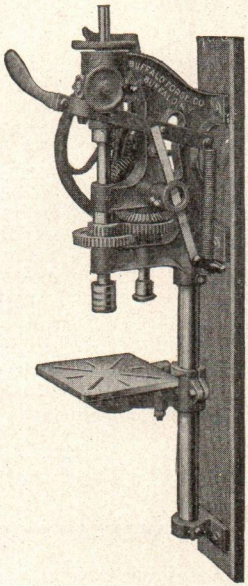


Fig. 6731C

The flywheel speed is independent of the spindle, giving full momentum where most needed—on slow, heavy work, where some drills fail.

No. 421. Drills 1½-inch hole to center of 21-inch circle. Run of feed, 4½ inches. Run of table, 21 inches. Diameter of drill spindle, 1¼ inches. Bored to take ½-inch straight shank bits. Can be furnished on special order bored for $\frac{41}{64}$ or ⅝-inch bits, at no extra cost. Length over all, 62 inches.

No. 421 is for hand power only. No. 421A, for hand and power, with tight and loose pulleys. Weight, No. 421, 280 pounds.

No. 421E. The same as No. 421, described above, with the additional feature of the electric drive. No. 421E is complete, with belt and ½ H. P., 110–220-volt D. C. motor and starting rheostat; speed, 1800 r. p. m.; or with belt and ½ H. P., 110–220 volt alternating current motor, single-phase, 60 cycles. Weight, No. 421E, 330 pounds.

No. 418. Drills 1½-inch hole to center of 18-inch circle. Run of feed, 4½ inches. Run of table, 18 inches. Diameter of drill spindle, 1¼ inches. Takes ½-inch straight shank bits. Also furnished for $\frac{41}{64}$ or ⅝-inch, on special order. Length over all, 62 inches. Weight, 265 pounds. Wheel-holding attachment free. No. 418 is without pulleys. No. 418A has tight and loose pulleys, 8 inches in diameter.

Number	421	421A	421E	418	418A
Price.....each	**40.00**	**44.00**	.....	**30.00**	**34.00**
" with D. C. Motor....."	.....	.....	**130.00**	.....	.....
" " A. C. " ....."	.....	.....	**158.00**	.....	.....

When writing about electric drive drills give full particulars about current. You can get this information from the company that furnishes your light or power.

DRILLS

No. 0½ WESTERN CHIEF DRILLS

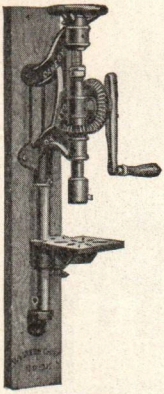


Fig. 23489A

A single geared hand-feed drill. It is a neat, durable article.

Bores 0 to ¾ inch. Drills to center of 12-inch circle. Up and down run of spindle, 2¾ inches. Up and down run of table, 9½ inches. Greatest distance from table to spindle, 9½ inches. Takes bits with ½-inch shanks.

Light wheel rims can be drilled by removing the table and using forked support as a wheel holder.

Weight, 50 pounds.

Price.....each **12.00**

No. 0 WESTERN CHIEF DRILLS

A simple, yet complete drill that is very satisfactory for light work.

Self-feed, fast and slow speed. Bores 0 to ¾ inch. Drills to center of 12-inch circle. Up and down run of spindle, 2¾ inches. Up and down run of table, 9½ inches. Greatest distance from table to spindle, 9½ inches. Takes bit with ½-inch shanks. Weight, 75 pounds.

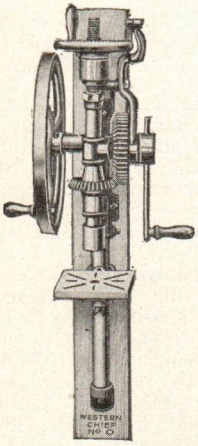


Fig. 23489B

The best material is used in its construction. Has steel mandrel, shafts and feed screw.

Light wheel rims can be drilled by removing table and using forked support as a wheel holder.

Price.....each **18.00**

No. BB BALL-BEARING DRILLS

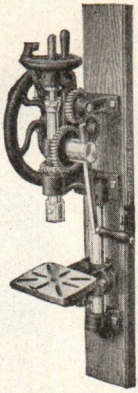


Fig. 23489C

A two-speed self-feed, ball-bearing post drill. The best material is used in its construction and it is built for hard service.

Bores, 0 to 1¼ inches. Drills to center of 14¾ inch circle. Up and down run of spindle, 3½ inches. Up and down run of table, 11 inches. Takes bits with ½-inch shanks.

Wheel rims can be drilled by removing table and using forked support as a wheel holder.

Weight, 110 pounds.

Price.....each **23.00**

No. 00 WESTERN CHIEF DRILLS

A reliable drill. Has two speeds, fast and slow. Self-feed, changeable speed.

Drills to center of 15-inch circle. Bores from 0 to 1¼ inches. Up and down run of spindle, 3 inches. Up and down run of table, 10¾ inches. Greatest distance from spindle to table, 13 inches. Size of pulleys for power, 8x2⅛ inches. Should run 200 revolutions per minute. Spindle bored for ½ or $\frac{41}{64}$-inch shank bits. Weight, 110 pounds.

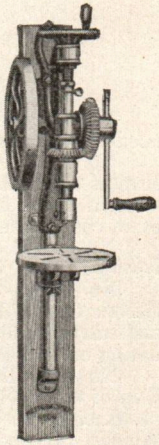


Fig. 23489D

Light rims can be drilled by removing table and using forked support as a wheel holder.

Price.....each **24.00**

" Hand and Pulley Power .....each **30.00**

Always state size of shank bits when ordering.

DRILLS

No. 1 WESTERN CHIEF DRILLS

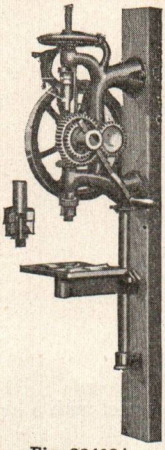


Fig. 23493A

Quick return. Self-feed, with three different speeds to feed: slow, medium and fast. Double geared for slow or fast speed. Slotted, rotating, swinging table. Drills to center of 15-inch circle. Bores 0 to 1½ inches. Up and down run of spindle, 2¾ inches. Up and down run of table, 13 inches.

Greatest distance from table to spindle, 13 inches. Size of pulleys for power, 8x2⅛ inches. Should run 200 revolutions per minute. Spindle bored for ½ or $\frac{41}{64}$-inch shank bits. Weight, 130 pounds.

Price.....each **35.00**
" Hand and Pulley Power
.....each **42.00**

Always state size of shank bits when ordering.

No. 3 WESTERN CHIEF DRILLS

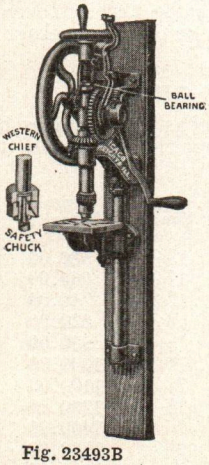


Fig. 23493B

Automatic self-feed.

Drills to center of 14½-inch circle. Bores, 0 to 1 inch. Up and down run of spindle, 3½ inches. Up and down run of table, 11 inches. Greatest distance from table to spindle, 10½ inches. Size of pulleys for power, 8x 2⅛ inches. Should run 200 revolutions per minute.

Spindle bored for ½ or $\frac{41}{64}$-inch shank bits. State size when ordering.

Weight, 95 pounds.

Price, No. 3.....each **22.00**
" Hand and Pulley Power
..... each **28.00**

No. 7 WESTERN CHIEF DRILLS

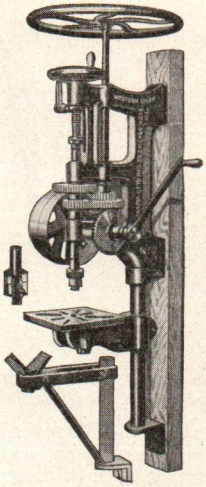


Fig. 23493C

Cut gears only are used in the No. 7 Western Chief Drill.

Has automatic self-feed. Fast and slow speed, instant change. Drills to center of 21-inch circle. Bores 0 to 1½ inches. Up and down run of spindle, 5 inches. Up and down run of table, 16½ inches. Greatest distance from table to spindle, 19½ inches. Size of pulleys for power, 10¾x2½ inches. Should run 175 to 180 revolutions per minute. Spindle, bored for ½ or $\frac{41}{64}$-inch shank bits. Weight, hand power, 275 pounds; pulley power, 295 pounds.

The shaft on this drill, when ordered hand power, is left extended to receive pulleys any time thereafter.

Wheel rims can be drilled by removing table and using forked support as a wheel-holder.

A special wheel holder attachment is furnished when ordered, for 3.00 extra.

Price, without Pulleys, Hand Power only.....each **75.00**
Price, with Pulleys..... " **82.00**

Always state size of shank bits to be used, when ordering.

Shipped without pulleys, unless otherwise ordered.

HOOVER STEEL BALLS

SPECIAL A, A AND HARDWARE GRADES

Fig. 11599A

SPECIAL A GRADE

These balls are made from the highest grade of special chrome alloy steel with a high-grade finish.

GUARANTEE.—These balls are guaranteed to be free from flaws and the variation in each package is guaranteed not to vary more than 1-10000 inch over or under the variation marked on each package, making a total tolerance not to exceed 2-10000 inch.

GRADE A

These balls are made from the same material as the Special A balls, with the same careful attention in each process, and the same high-grade finish. The tolerance in these balls is between 1-1000 inch over or under the given size.

GUARANTEE.—These balls are guaranteed to be free from flaws and the variation in each package is guaranteed not to vary more than 3-10000 inch over or under the variation marked on each package, making a total variation on each package not to exceed 6-10000 inch.

HARDWARE GRADE

These balls are made of same grade of steel as above grades but not guaranteed as to accuracy and may have a variation of several thousandths of an inch over or under the given size.

Size Inches	Price per 1000	Size Inches	Price per 1000	Size Inches	Price per 1000	Size Inches	Price per 1000
1/16	4.00	5/8	68.00	1 1/2	580.00	2 3/4	4000.00
3/32	3.00	11/16	80.00	1 9/16	660.00	2 7/8	4800.00
1/8	3.00	3/4	96.00	1 5/8	740.00	3	5600.00
5/32	3.60	13/16	110.00	1 11/16	820.00	3 1/4	6500.00
3/16	4.00	7/8	130.00	1 3/4	900.00	3 1/2	7500.00
7/32	4.80	15/16	160.00	1 13/16	1000.00	3 3/4	8500.00
1/4	6.00	1	190.00	1 7/8	1100.00	4	10000.00
9/32	9.00	1 1/16	210.00	1 15/16	1200.00	....	.....
5/16	12.00	1 1/8	240.00	2	1400.00	....	.....
11/32	16.00	1 3/16	270.00	2 1/8	1700.00	....	.....
3/8	20.00	1 1/4	310.00	2 1/4	2000.00	....	.....
7/16	28.00	1 5/16	350.00	2 3/8	2400.00	....	.....
1/2	40.00	1 3/8	420.00	2 1/2	2800.00	....	.....
9/16	56.00	1 7/16	500.00	2 5/8	3400.00	....	.....

WHITNEY KEYS AND CUTTERS

WOODRUFF'S SYSTEM

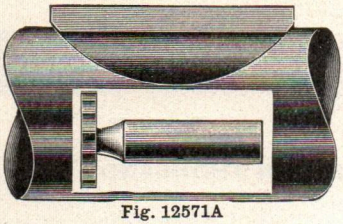


Fig. 12571A

PULLEY OR GEAR SPLINED ON AN ANGLE

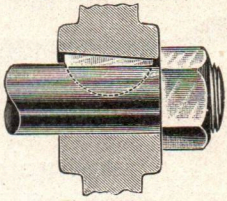


Fig. 12571B

Regular carbon keys are made from a special quality of carbon steel and the nickel steel keys are made from a fine quality of nickel steel properly treated to give the maximum strength. Whitney Keys reach deep into the shaft, being firmly embedded and therefore capable of standing great strain. It is impossible for the keys to roll over in their seat, as is often the case with ordinary keys.

When it is necessary to put a nut on the end of the shaft the threads may be cut full size. The keys will rock in their seats and adjust themselves perfectly to the angular spline, thus giving a bearing throughout their entire length.

No.	Size Inches	Thickness of Keys in Thousandths	Price, Keys per Hundred		Price Cutters Each		No.	Size Inches	Thickness of Keys in Thousandths	Price, Keys per Hundred		Price Cutters Each	
			Regular Steel	Nickel Steel	Carbon Steel	High Speed Steel				Regular Steel	Nickel Steel	Carbon Steel	High Speed Steel
1	1/2x1/16	.0625	.33	.51	.55	.75	24	1 1/2x1/4	.250	2.51	3.49	1.15	3.25
2	1/2x3/32	.0937	.33	.51	.55	.75	25	1 1/2x5/16	.3125	2.91	4.05	1.15	3.25
3	1/2x1/8	.125	.35	.52	.55	.75	G	1 1/2x3/8	.375	3.32	4.61	1.15	3.25
4	5/8x3/32	.0937	.33	.48	.60	.90	126	2 1/8x3/16	.1875	1.61	2.34	....	....
5	5/8x1/8	.125	.37	.55	.60	.90	127	2 1/8x1/4	.250	1.84	2.69	....	....
6	5/8x5/32	.1562	.44	.65	.60	.90	128	2 1/8x5/16	.3125	2.07	3.01	....	....
7	3/4x1/8	.125	.42	.62	.65	1.05	129	2 1/8x3/8	.375	2.29	3.34	....	....
8	3/4x5/32	.1562	.50	.74	.65	1.05	26	2 1/8x3/16	.1875	2.72	3.94	....	....
9	3/4x3/16	.1875	.59	.87	.65	1.05	27	2 1/8x1/4	.250	3.06	4.43	....	....
10	7/8x5/32	.1562	.71	1.03	.70	1.30	28	2 1/8x5/16	.3125	3.40	4.93	....	....
11	7/8x3/16	.1875	.76	1.11	.70	1.30	29	2 1/8x3/8	.375	3.75	5.42	....	....
12	7/8x7/32	.2187	.84	1.23	.70	1.30	RX	2 3/4x1/4	.250	3.56	5.17	....	....
A	7/8x1/4	.250	.94	1.37	.70	1.30	SX	2 3/4x5/16	.3125	4.04	5.85	....	....
13	1 x3/16	.1875	.97	1.40	.78	1.75	TX	2 3/4x3/8	.375	4.51	6.53	....	....
14	1 x7/32	.2187	1.07	1.54	.78	1.75	UX	2 3/4x7/16	.4375	4.99	7.23	....	....
15	1 x1/4	.250	1.19	1.71	.78	1.75	VX	2 3/4x1/2	.500	5.47	7.92	....	....
B	1 x5/16	.3125	1.38	2.05	.78	1.75	R	2 3/4x1/4	.250	4.26	6.19	....	....
16	1 1/8x3/16	.1875	1.23	1.71	.85	2.00	S	2 3/4x5/16	.3125	4.88	7.08	....	....
17	1 1/8x7/32	.2187	1.34	1.88	.85	2.00	T	2 3/4x3/8	.375	5.50	7.97	....	....
18	1 1/8x1/4	.250	1.46	2.04	.85	2.00	U	2 3/4x7/16	.4375	6.11	8.88	....	....
C	1 1/8x5/16	.3125	1.71	2.44	.85	2.00	V	2 3/4x1/2	.500	6.73	9.77	....	....
19	1 1/4x3/16	.1875	1.50	2.17	.95	2.50	30	3 1/2x3/8	.375	8.14	....	....	....
20	1 1/4x7/32	.2187	1.64	2.38	.95	2.50	31	3 1/2x7/16	.4375	9.45	....	....	....
21	1 1/4x1/4	.250	1.78	2.56	.95	2.50	32	3 1/2x1/2	.500	10.76	....	....	....
D	1 1/4x5/16	.3125	2.05	2.97	.95	2.50	33	3 1/2x9/16	.5625	12.06	....	....	....
E	1 1/4x3/8	.375	2.33	3.37	.95	2.50	34	3 1/2x5/8	.625	13.37	....	....	....
22	1 3/8x1/4	.250	2.15	2.95	1.05	2.75	35	3 1/2x11/16	.6875	14.67	....	....	....
23	1 3/8x5/16	.3125	2.47	3.40	1.05	2.75	36	3 1/2x3/4	.750	15.98	....	....	....
F	1 3/8x3/8	.375	2.79	3.82	1.05	2.75	....	.....	.....	.....	....	....	....

Keys and cutters correspond in size and number.

Cutters Nos. 1 to G, inclusive, have uniform 1/2-inch shanks, same as shown above. Cutters Nos. 126 to 129, inclusive, and Nos. 26 to 29, inclusive, are side mill type, with 3/4-inch hole. Cutters RX to No. 36, inclusive, are side mill type with 1-inch hole.

SPRING COTTERS, ETC.

SPRING COTTER

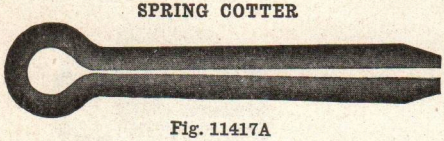


Fig. 11417A

FLAT SPRING KEY

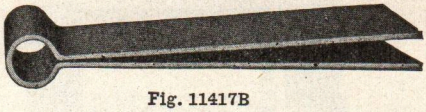


Fig. 11417B

SPRING COTTERS—PRICE, PER THOUSAND

Wire Ga.	13	12	11	10	9	8	7	6	5	4	1	.....	.....	.....	.....
Diam. In.	3/32	7/64	1/8	9/64	5/32	11/64	3/16	13/64	7/32	1/4	5/16	3/8	7/16	1/2	5/8
Length, Inches															
1/2	3.50	4.00	5.00	6.00	7.00	8.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
3/4	4.15	4.75	5.85	7.00	8.15	9.30	11.10	12.00	.....	.....	.....	.....	.....	.....	.....
1	4.80	5.50	6.70	8.00	9.30	10.60	12.80	14.00	18.00	20.00	32.50	.....	.....	.....	.....
1 1/4	5.45	6.25	7.55	9.00	10.45	11.90	14.50	16.00	20.80	23.50	37.50	.....	.....	.....	.....
1 1/2	6.10	7.00	8.40	10.00	11.60	13.20	16.20	18.00	23.60	27.00	42.50	72.00	.....	.....	.....
1 3/4	6.75	7.75	9.25	11.00	12.75	14.50	17.90	20.00	26.40	30.50	47.50	79.20	108.00	.....	.....
2	7.40	8.50	10.10	12.00	13.90	15.80	19.60	22.00	29.20	34.00	52.50	86.40	119.50	148.50	.....
2 1/4	....	....	10.95	13.00	15.05	17.10	21.30	24.00	32.00	37.50	57.50	93.60	131.00	163.50	.....
2 1/2	....	....	11.80	14.00	16.20	18.40	23.00	26.00	34.80	41.00	62.50	100.80	142.50	178.50	.....
2 3/4	....	....	....	....	....	....	24.70	28.00	37.60	44.50	67.50	108.00	154.00	193.50	.....
3	....	....	....	....	....	....	26.40	30.00	40.40	48.00	72.50	115.20	165.50	208.50	384.00
3 1/4	....	....	....	....	....	....	....	....	....	51.50	77.50	122.40	177.00	223.50	404.00
3 1/2	....	....	....	....	....	....	....	....	....	55.00	82.50	129.60	188.50	238.50	424.00
3 3/4	....	....	....	....	....	....	....	....	....	58.50	87.50	136.80	200.00	253.50	444.00
4	....	....	....	....	....	....	....	....	....	62.00	92.50	144.00	211.50	268.50	464.00
5	....	....	....	....	....	....	....	....	....	....	....	....	257.50	328.50	544.00
6	....	....	....	....	....	....	....	....	....	....	....	....	....	388.50	644.00

Brass spring cotters all sizes to order. Prices quoted on receipt of specifications.

FLAT SPRING KEYS—PRICE, PER THOUSAND

Length....inches	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2
Width, 3/8 inches	39.00	44.50	50.00	55.50	61.00	66.50	72.00	77.50	.....	.....
" 1/2 "	52.00	58.00	64.00	70.00	76.00	82.00	88.00	94.00	.....	.....
" 5/8 "	.....	.....	78.00	84.50	91.00	97.50	104.00	110.50	117.00	123.50
" 3/4 "	.....	.....	.....	104.00	111.00	118.00	125.00	132.00	139.00	146.00
" 7/8 "	.....	.....	.....	125.00	131.00	138.00	147.00	155.00	162.00	170.00

FLAT RIVETED KEYS

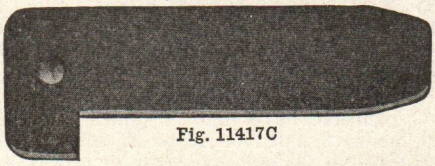


Fig. 11417C

123 different sizes and patterns. Prices and catalogue on application.

STANDARD TAPER PINS

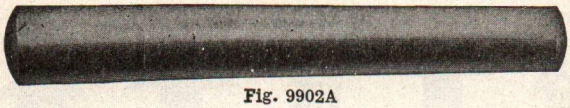


Fig. 9902A

PRICE, PER HUNDRED

Number	00	0	1	2	3	4	5	6	7	8	9	10
Diam. of Large End, inches	.141	.156	.172	.193	.219	.250	.289	.341	.409	.492	.591	.706
Approx. Fractional Sizes, inches	9/64	5/32	11/64	3/16	7/32	1/4	19/64	11/32	13/32	1/2	19/32	23/32
Length, Inches: ½	1.80	1.80	2.00	....	....	....	....	....	....	....	....	....
¾	1.80	1.80	2.00	2.10	2.30	2.50	2.75	3.00	....	....	....	....
1	2.05	2.05	2.25	2.35	2.55	2.75	3.00	3.25	3.75	....	....	....
1¼	2.30	2.30	2.50	2.60	2.80	3.00	3.25	3.50	4.00	4.65	....	....
1½	2.55	2.55	2.75	2.85	3.05	3.25	3.50	3.75	4.25	5.00	7.00	9.00
1¾	2.80	2.80	3.00	3.10	3.30	3.50	3.75	4.00	4.50	5.40	7.50	9.50
2	3.05	3.05	3.25	3.35	3.55	3.75	4.05	4.35	4.75	5.80	8.00	10.00
2¼	....	3.30	3.50	3.60	3.80	4.00	4.40	4.75	5.25	6.25	8.60	10.75
2½	...	3.55	3.75	3.85	4.05	4.25	4.75	5.20	5.75	6.75	9.20	11.50
2¾	....	....	4.00	4.10	4.30	4.50	5.10	5.70	6.25	7.25	9.80	12.25
3	..	....	4.25	4.35	4.55	4.75	5.45	6.25	6.75	7.80	10.50	13.25
3¼	....	....	....	4.60	4.80	5.00	5.80	6.75	7.25	8.40	11.20	14.25
3½	....	....	....	4.85	5.05	5.25	6.15	7.25	7.75	9.00	11.90	15.25
3¾	....	....	....	....	....	5.50	6.50	7.75	8.25	9.60	12.60	16.25
4	....	....	....	....	....	5.75	6.85	8.25	8.75	10.20	13.30	17.25
4¼	....	....	....	....	....	....	....	8.75	9.25	10.80	14.00	18.25
4½	....	....	....	....	....	....	....	9.25	9.75	11.40	14.70	19.25
4¾	....	....	....	....	....	....	....	9.75	10.25	12.00	15.40	20.25
5	....	....	....	....	....	....	....	10.25	10.75	12.60	16.10	21.25
5¼	....	....	....	....	....	....	....	....	....	....	16.80	22.25
5½	....	....	....	....	....	....	....	....	....	....	17.50	23.25
5¾	....	....	....	....	....	....	....	....	....	....	18.20	24.25
6	....	....	....	....	....	....	....	....	....	....	18.90	25.25

Taper ¼ inch to the foot. If ordering sizes other than those included in the above list, specify the length and the diameter at the larger end.

RIVETS

CONE HEAD

Fig. 1031A

ROUND HEAD

Fig. 1031B

FLAT HEAD

Fig. 1031C

COUNTERSUNK HEAD

Fig. 1031D

WAGON BOX HEAD

Fig. 1031E

OVAL HEAD

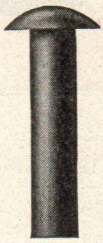


Fig. 1031F

TRUSS HEAD

Fig. 1031G

PRICE PER POUND—IN 5 AND 10-POUND BOXES

ADOPTED JANUARY 8, 1904

Size Wire	1 and Longer	7/8	3/4	5/8	1/2	15/32	7/16	13/32	3/8	11/32	5/16	9/32	1/4	7/32	3/16	5/32	1/8	3/32
	Length, Inches																	
7/16	.19	.19½	.19½	.20	.20	...	...	...	...	...	...	...	...	...	...	...	...	...
3/8	.19	.19½	.19½	.20	.20	.21	...	...	...	...	...	...	...	...	...	...	...	...
11/32	.19½	.20	.20	.20½	.20½	.21	.21	...	...	...	...	...	...	...	...	...	...	...
5/16	.19½	.20	.20	.20½	.20½	.21	.22	.22	.22	...	...	...	...	...	...	...	...	...
1	.20	.20½	.20½	.21	.21	.22	.23	.23	.23	.23	...	...	...	...	...	...	...	...
2	.20	.20½	.20½	.21	.21	.22	.23	.23	.23	.23	.24	...	...	...	...	...	...	...
3	.20	.20½	.20½	.21	.21	.22	.23	.23	.23	.23	.24	.24	.24	...	...	...	...	...
1/4	.20	.20½	.20½	.21	.21	.22	.23	.23	.23	.23	.24	.24	.24	.25	.25	...	...	...
4	.21	.21½	.21½	.22	.22	.23	.23	.24	.24	.24	.24	.24	.24	.25	.25	.26	...	...
5	.21	.21½	.21½	.22	.22	.23	.24	.24	.24	.24	.25	.26	.26	.27	.27	.28	.28	.29
6	.21	.21½	.21½	.22	.22	.23	.24	.24	.25	.25	.26	.26	.27	.28	.29	.29	.29	.30
3/16	.21	.21½	.21½	.22	.22	.23	.24	.24	.25	.25	.26	.26	.27	.28	.29	.30	.31	.32
7	.21	.21½	.22	.23	.23	.24	.24	.24	.25	.25	.26	.26	.27	.28	.29	.30	.31	.32
8	.22	.22½	.22½	.23	.23	.24	.25	.25	.26	.26	.27	.27	.28	.29	.30	.31	.32	.33
9	.23	.23½	.23½	.24	.24	.25	.26	.26	.27	.27	.29	.29	.29	.30	.31	.33	.35	.36
10	.24	.24½	.24½	.25	.25	.26	.27	.28	.29	.31	.33	.34	.34	.36	.39	.41	.43	.44
11	.25	.25½	.25½	.26	.26	.28	.30	.32	.33	.34	.36	.37	.37	.39	.43	.46	.48	.51
12	.26	.26½	.26½	.27	.27	.30	.32	.34	.35	.36	.38	.40	.41	.42	.47	.51	.56	.61
13	.30	.30½	.30½	.31	.31	.33	.36	.39	.40	.41	.43	.45	.46	.47	.51	.56	.61	.66
14	.32	.32½	.32½	.33	.33	.36	.41	.44	.46	.51	.56	.58	.61	.64	.64	.66	.69	.71

Rivets made from smaller wire than No. 14, all lengths, list 80 cents per pound; 3/32-inch diameter, list price of No. 13; 1/8-inch diameter, list price of No. 11; 5/32-inch diameter, list price of No. 8; 7/32-inch diameter, list price of No. 5; 9/32-inch diameter, list price of No. 2.

List extras: For shoulder and pointed rivets, add 2 cents per pound to list price for each specialty, except pointed hame, caster and sucker rod. Intermediate lengths and diameters, list prices of nearest smaller size.

Tinners' and coopers' rivets: For oval head and shoulder or extra length rivets, add 2 cents per pound to list price.

Net extras: For tin or copper-plated, add 1 cent per pound to net price. For metallic tinning, add 3½ cents per pound to net price.

List rebates: For 25 and 50-pound boxes, deduct 2 cents, and for 100 and 200-pound kegs, deduct 4 cents per pound from list price.

BOILER AND STRUCTURAL RIVETS

CONE HEAD

Fig. 5569A

COUNTERSUNK HEAD

Fig. 5569B

BUTTON HEAD

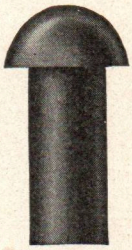


Fig. 5569C

AVERAGE NUMBER OF CONE HEAD RIVETS OF ENUMERATED SIZES IN 100 POUNDS

Lgth. In.	Diameter, Inches							Lgth. In.	Diameter, Inches						
	3/8	1/2	5/8	11/16	3/4	7/8	1		3/8	1/2	5/8	11/16	3/4	7/8	1
3/4	2373	1103	642	...	...	...	...	3 1/2	837	433	270	208	177	126	82
7/8	2190	1030	604	...	...	...	...	3 3/4	791	411	257	198	168	120	79
1	2034	968	571	400	345	...	...	4	749	390	244	189	161	115	77
1 1/8	1898	910	541	382	322	208	...	4 1/4	700	372	233	180	155	110	75
1 1/4	1780	862	514	365	311	206	...	4 1/2	650	355	223	172	149	105	73
1 3/8	1675	815	489	350	295	204	...	4 3/4	625	339	214	166	143	101	71
1 1/2	1582	776	462	335	284	201	...	5	600	325	205	160	136	97	69
1 5/8	1498	740	446	324	275	199	132	5 1/4	575	312	197	154	131	94	67
1 3/4	1424	707	428	311	266	192	128	5 1/2	550	300	190	149	127	91	65
1 7/8	1356	672	411	302	257	185	124	5 3/4	525	289	183	144	123	88	63
2	1295	648	395	293	249	178	120	6	500	279	177	139	118	85	61
2 1/8	1238	623	381	285	240	172	116	6 1/4	...	...	171	135	114	82	59
2 1/4	1187	599	367	277	233	167	112	6 1/2	...	...	165	131	110	79	57
2 3/8	1139	577	354	269	226	162	108	6 3/4	...	...	160	127	107	77	55
2 1/2	1095	556	343	261	219	157	104	7	...	...	155	123	104	75	53
2 5/8	1052	537	332	253	212	152	100	7 1/4	...	...	150	119	100	73	51
2 3/4	1017	519	321	245	206	148	96	7 1/2	...	...	146	116	97	71	49
2 7/8	982	503	311	237	201	144	92	7 3/4	...	...	142	113	94	69	47
3	949	487	302	230	196	140	88	8	...	...	138	110	92	67	45
3 1/4	890	459	285	218	186	132	85	...	...	...	...	...	...	...	..

STANDARD LIST OF EXTRAS—ADOPTED OCTOBER 15, 1912

On Boiler and Structural Rivets. In Kegs or Bags Weighing 200 to 300 Pounds

Boiler Rivets, Standard Heads, 3/4 to 1 1/4-in. Diameter, Inclusive, 2 to 5 in. Long	**Base**
Structural Rivets, Standard Heads, 3/4 to 1 1/4-in. Diam., " 2 " 5 " "	**Base**

EXTRAS, PER 100 POUNDS—ADOPTED OCTOBER 15, 1912

1/2 and 9/16-inch Diameter	.50
5/8 " 11/16 " "	.15
Larger than 1 1/4-inch Diameter	.25
Lengths 1 inch and Shorter, All Diameters from 1/2-inch up	.50
" between 1 and 2 Inches	.25
" over 5 Inches	.25
Flat Head Standard Countersunk Head and Swell Neck Rivets	.25
Rivets packed in 100-pound Kegs	.10
Items under 100 Pounds of a Size, for Each Broken Lot	*.50
Rivets 5 in. Long or Over, Ordered in Lots of 1000 lbs. or Less than 1000 Lbs.	.25

*Net.

All cone and countersunk head rivets to be charged at boiler rivet price.

Special rivets and rivets made cold, to be charged extra at discretion of maker.

When ordering, specify whether large (200 to 300-pound) or small (100-pound) kegs are wanted.

IRON SET SCREWS

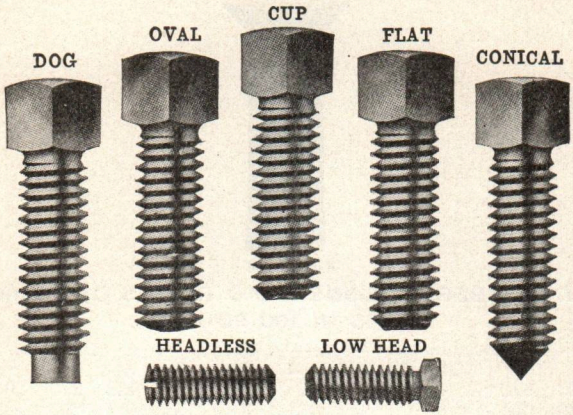


Fig. 12247A

PRICE PER HUNDRED

Diam. of Screw, Inches	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1	1⅛	1¼
Length under Head to Extreme Point, Inches												
½	1.80	2.00	2.35	....	.....	.....	.....	.....	.....	.....	.....	.....
⅝	1.90	2.10	2.45	2.80	3.30	.....	.....	.....	.....	.....	.....	.....
¾	2.00	2.20	2.50	2.90	3.40	5.00	5.00	.....	.....	.....	.....	.....
⅞	2.10	2.30	2.60	3.00	3.60	5.50	5.50	.....	.....	.....	.....	.....
1	2.15	2.35	2.65	3.10	3.80	5.75	5.75	10.00	.....	.....	.....	.....
1¼	2.30	2.50	2.85	3.50	4.30	6.50	6.50	11.00	15.50	.....	.....	.....
1½	2.50	2.70	3.10	4.00	4.80	7.25	7.25	12.00	16.20	22.00	.....	.....
1¾	2.75	3.00	3.50	4.50	5.40	8.00	8.00	12.80	17.70	24.00	41.70	.....
2	3.25	3.50	4.00	5.15	6.00	8.80	8.80	13.60	19.20	26.00	45.00	54.00
2¼	3.75	4.00	4.50	5.75	6.75	9.60	9.60	14.50	20.70	28.00	48.30	58.30
2½	4.25	4.50	5.00	6.35	7.50	10.40	10.40	15.40	22.20	30.00	51.60	62.60
2¾	4.75	5.00	5.50	6.75	8.25	11.20	11.20	16.30	23.70	32.00	54.90	66.90
3	5.25	5.50	6.00	7.20	9.00	12.00	12.00	17.30	25.20	34.00	58.20	71.20
3¼	....	....	....	7.60	9.75	12.75	12.75	18.40	26.70	36.00	61.50	75.50
3½	....	....	....	8.00	10.50	13.50	13.50	19.50	28.20	38.00	64.80	79.80
3¾	....	....	....	8.50	11.25	14.30	14.30	20.75	29.70	40.00	68.10	84.10
4	....	....	....	9.00	12.00	15.10	15.10	22.00	31.20	42.00	71.40	88.40
4¼	....	....	....	....	.....	.....	15.90	23.50	32.70	44.00	74.70	92.70
4½	....	....	....	....	.....	.....	16.70	25.00	34.20	46.00	78.00	97.00
4¾	....	....	....	....	.....	.....	.....	26.50	35.70	48.00	81.30	101.30
5	....	....	....	....	.....	.....	.....	.....	37.20	50.00	84.60	105.60
Threads to Inch	20	18	16	14	12	12	11	10	9	8	7	7
Add for each ¼ Inch	.50	.60	.70	.80	.90	1.10	1.10	1.50	1.70	2.25	3.30	4.30

For price of steel set screws, add 25 per cent to the above list.

SET SCREWS

ALLEN SAFETY SET SCREWS

HEXAGON SHAPED HOLE

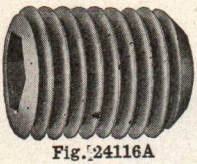


Fig. 24116A

These screws are guaranteed.

Be particular to specify the style of thread on your order.

Eight wrenches furnished free with each 100 screws.

Cup and oval points are factory stock points.

Diam. of Screw Inches	Length of Screw Inches	Hexagon Hole Inches	Standard Thread U. S. S.	Thread V	Price Each
1/4	5/16	1/8	20	20	5.00
5/16	5/16	5/32	18	18	5.00
	3/8	5/32	18	18	5.00
3/8	3/8	3/16	16	16	5.00
	1/2	3/16	16	16	5.00
7/16	7/16	7/32	14	14	6.00
	1/2	7/32	14	14	6.00
1/2	1/2	1/4	13–12	12–13	7.00
	5/8	1/4	13–12	12–13	7.00
9/16	9/16	5/16	12	12	8.00
5/8	5/8	5/16	11	11	10.00
	3/4	5/16	11	11	10.00
3/4	3/4	3/8	10	10	12.00
	1	3/8	10	10	12.00
7/8	7/8	1/2	9	9	15.00
	1 1/8	1/2	9	9	15.00
1	1	9/16	8	8	20.00
	1 1/4	9/16	8	8	22.00

EXTRA WRENCHES

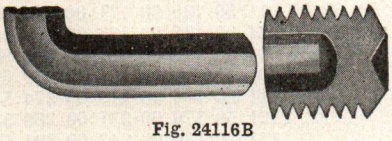


Fig. 24116B

Size of Hex. Hole, in.	1/8	5/32	3/16	7/32
Diam. of Screw.. "	1/4	5/16	3/8	7/16
Price.....each	...	...	...	...
Size of Hex. Hole, in.	1/4	5/16	5/16	3/8
Diam of Screw.. "	1/2	9/16	5/8	3/4
Price.....each	...	...	...	...
Size of Hex. Hole, in.	1/2	9/16	...	...
Diam. of Screw. "	7/8	1	...	...
Price.....each	...	...	...	...

STANDCO HOLLOW LIFE-SAVING SET SCREWS

HEXAGON—CUP POINTED

Fig. 24116C

Furnished with square or hexagon shaped hole. Extremely hard, tough, and are uniform as to size. One wrench packed in each box.

Diam. Inches	Length Inches	U. S. S. Threads per Inch	No. in Box	Price per 100
†1/4	5/16	20	100	3.30
5/16	5/16	18	100	3.30
3/8	3/8	16	100	3.30
*3/8	1/2	16	100	3.50
7/16	1/2	14	50	3.60
1/2	9/16	13	50	3.90
*1/2	9/16	12	50	3.90
9/16	9/16	12	25	4.70
5/8	5/8	11	50	5.40
*5/8	3/4	11	50	6.40
3/4	7/8	10	25	8.40
7/8	1	9	25	12.50
1	1 1/4	8	25	16.75

*Furnished only when specially ordered. †Made with hexagon hole only. Unless otherwise specified, hexagon hole screws will be shipped. Samples upon application.

WRENCHES FOR HOLLOW SET SCREWS

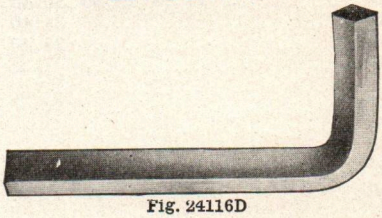


Fig. 24116D

For Set Screws Inches	Price per 100	For Set Screws Inches	Price per 100	For Set Screws Inches	Price per 100
5/16	1.15	1/2	1.75	3/4	3.50
3/8	1.15	9/16	1.90	7/8	4.00
7/16	1.45	5/8	2.30	1	4.90

In ordering, specify whether for hexagon or square screw.

MAC-IT SET SCREWS

SQUARE HEAD

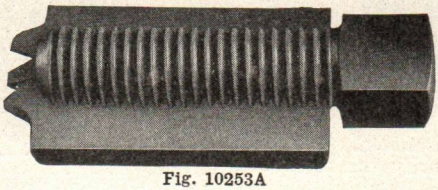


Fig. 10253A

Made by a special process and much stronger than the ordinary set screw.

	Price, per 100—Diameter, Inches											
	1/4	5/16	3/8	7/16	*1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Length Inches	Number of Threads per Inch											
	20	18	16	14	13	12	11	10	9	8	7	7
1/2	4.30	5.35	6.45	....	....	....	....	....	....	....	....	....
5/8	4.60	5.65	6.85	7.40	8.90	....	....	....	....	....	....	....
3/4	4.90	5.95	7.25	7.90	9.40	11.40	12.50	....	....	....	....	....
7/8	5.20	6.25	7.65	8.40	9.90	12.00	13.20	....	....	....	....	....
1	5.50	6.55	8.05	8.90	10.40	12.60	13.90	17.20	21.50	40.00	....	....
1 1/4	6.10	7.15	8.85	9.90	11.40	13.80	15.30	18.90	24.00	44.30	....	....
1 1/2	6.70	7.75	9.65	10.90	12.40	15.00	16.70	20.60	26.50	48.60	63.00	79.50
1 3/4	7.30	8.35	10.45	11.90	13.40	16.20	18.10	22.30	29.00	52.90	69.00	87.00
2	7.90	8.95	11.25	12.90	14.40	17.40	19.50	24.00	31.50	57.20	75.00	94.50
2 1/4	8.50	9.55	12.05	13.90	15.40	18.60	20.90	25.70	34.00	61.50	81.00	102.00
2 1/2	9.10	10.15	12.85	14.90	16.40	19.80	22.30	27.40	36.50	65.80	87.00	109.50
2 3/4	9.70	10.75	13.65	15.90	17.40	21.00	23.70	29.10	39.00	70.10	93.00	117.00
3	10.30	11.35	14.45	16.90	18.40	22.20	25.10	30.80	41.50	74.40	99.00	124.50
3 1/4	....	....	15.25	17.90	19.40	23.40	26.50	32.50	44.00	78.70	105.00	132.00
3 1/2	....	....	16.05	18.90	20.40	24.60	27.90	34.20	46.50	83.00	111.00	139.50
3 3/4	....	....	16.85	19.90	21.40	25.80	29.30	35.90	49.00	87.30	117.00	147.00
4	....	....	17.65	20.90	22.40	27.00	30.70	37.60	51.50	91.60	123.00	154.50
4 1/2	....	....	21.25	24.90	26.40	29.40	33.50	41.00	56.50	100.20	135.00	169.50
5	....	....	24.85	28.90	30.40	34.20	36.30	44.40	61.50	108.80	147.00	184.50
5 1/2	....	....	....	....	34.40	39.00	41.90	51.20	66.50	117.40	159.00	199.50
6	....	....	....	....	38.40	43.80	47.50	58.00	71.50	126.00	171.00	214.50
6 1/2	....	....	....	....	....	....	....	64.80	81.50	136.00	183.00	229.50
7	....	....	....	....	....	....	....	71.60	91.50	146.00	195.00	244.50
7 1/2	....	....	....	....	....	....	....	78.40	101.50	156.00	207.00	259.50
8	....	....	....	....	....	....	....	85.20	111.50	166.00	219.00	274.50
8 1/2	....	....	....	....	....	....	....	....	121.50	176.00	231.00	289.50
9	....	....	....	....	....	....	....	....	131.50	186.00	243.00	304.50
9 1/2	....	....	....	....	....	....	....	....	.....	196.00	255.00	319.50
10	....	....	....	....	....	....	....	....	.....	206.00	267.00	334.50
10 1/2	....	....	....	....	....	....	....	....	.....	216.00	279.00	349.50
11	....	....	....	....	....	....	....	....	.....	226.00	291.00	364.50
11 1/2	....	....	....	....	....	....	....	....	.....	236.00	303.00	379.50
12	....	....	....	....	....	....	....	....	.....	246.00	315.00	394.50

*The 1/2-inch size can also be furnished 12 thread U. S. standard form.
Odd sizes not listed will take list price of next larger size.
All orders will be filled with U. S. standard thread, unless otherwise specified.
Cup point will be sent unless otherwise specified.

SQUARE AND HEXAGON HEAD CAP SCREWS

SQUARE HEAD

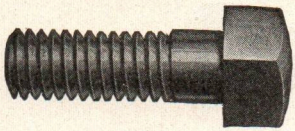


Fig. 1151A

HEXAGON HEAD

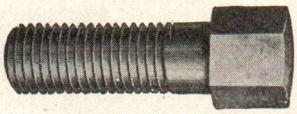


Fig. 1151B

PRICE, PER HUNDRED

Diameter of Square Head Inches		3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1 1/8	1 1/4	1 3/8	1 1/2
Diameter of Hexagon Head Inches		7/16	1/2	9/16	5/8	3/4	13/16	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Diameter of Screw Inches		1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Length under Head to Extreme Point, Inches	3/4	3.00	3.25	3.75	4.50	5.70	....	....	....	....	....	....	....
	7/8	3.15	3.40	3.90	4.70	5.80	....	....	....	....	....	....	....
	1	3.25	3.50	4.00	4.90	5.90	9.25	9.25	....	....	....	....	....
	1 1/4	3.50	3.75	4.25	5.30	6.50	9.50	9.50	12.50	....	....	....	....
	1 1/2	3.75	4.00	4.50	5.70	7.10	10.00	10.00	13.50	18.40	....	....	....
	1 3/4	4.00	4.25	4.85	6.10	7.70	10.75	10.75	14.50	19.70	22.75	....	....
	2	4.25	4.85	5.20	6.50	8.30	11.50	11.50	15.50	21.00	25.00	34.00	38.50
	2 1/4	4.70	5.35	5.55	7.15	8.90	12.60	12.60	16.50	22.40	27.25	36.75	42.00
	2 1/2	5.25	5.80	6.00	7.50	9.50	13.60	13.60	17.50	23.70	29.50	39.50	45.50
	2 3/4	5.75	6.30	6.65	7.90	10.10	14.40	14.40	19.00	25.00	31.75	42.25	49.00
	3	6.25	6.80	7.20	8.40	10.70	15.20	15.20	20.60	26.40	34.00	45.00	52.50
	3 1/4	....	....	....	9.15	11.50	16.00	16.00	22.10	28.20	36.25	47.75	56.00
	3 1/2	....	....	....	9.75	12.30	17.30	17.30	23.70	30.00	38.50	50.50	59.50
	3 3/4	....	....	....	10.50	13.10	18.60	18.60	25.30	31.80	40.75	53.25	63.00
	4	....	....	....	11.10	13.90	19.90	19.90	26.90	33.60	43.00	56.00	66.50
	4 1/4	....	....	....	....	....	....	21.20	28.50	35.40	45.25	58.75	70.00
	4 1/2	....	....	....	....	....	....	22.50	30.10	37.20	47.50	61.50	73.50
	4 3/4	....	....	....	....	....	....	....	31.70	39.00	49.75	64.25	77.00
	5	....	....	....	....	....	....	....	....	40.80	52.00	67.00	80.50
Threads to inch		20	18	16	14	12	12	11	10	9	8	7	7
Add for each 1/4 inch		.40	.50	.60	.70	.80	1.30	1.30	1.60	1.80	2.25	2.75	3.50

In ordering screws 1/2 inch in diameter, advise whether wanted with 12 or 13 threads

S. A. E. HEXAGON HEAD CAP SCREWS

Fig. 19200A

PRICE, PER HUNDRED

Diameter of Head, Inches	7/16	1/2	9/16	5/8	3/4	7/8	15/16	1	1 1/16	1 1/4
Height of Head, Inches	3/16	15/64	9/32	21/64	3/8	27/64	15/32	33/64	9/16	21/32
Length of Thread, Inches	3/8	15/32	9/16	21/32	3/4	27/32	15/16	1 1/32	1 1/8	1 5/16
Threads to Inch	28	24	24	20	20	18	18	16	16	14
Diameter of Screw, Inches	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8
Length under Head to Extreme Point, Inches										
3/4	3.45	4.10	4.70	6.50	7.00	....	....	....	....	....
7/8	3.65	4.30	4.90	6.60	7.20	....	....	....	....	....
1	3.85	4.50	5.10	6.80	7.40	....	....	....	....	....
1 1/4	4.10	4.80	5.35	7.35	8.15	11.90	....	....	....	....
1 1/2	4.40	5.10	5.65	8.00	8.90	12.50	14.70	16.90	....	....
1 3/4	4.70	5.45	6.05	8.65	9.65	13.45	15.80	18.15	24.65	28.45
2	5.00	6.05	6.50	9.25	10.40	14.40	16.90	19.40	26.25	31.25
2 1/4	5.90	6.70	6.95	10.05	11.15	15.75	18.20	20.65	28.00	34.10
2 1/2	6.55	7.25	7.50	10.65	11.90	17.00	19.45	21.90	29.65	36.90
2 3/4	7.20	7.90	8.30	11.25	12.60	18.00	20.90	23.80	31.25	39.70
3	7.80	8.50	9.00	11.95	13.40	19.00	22.40	25.75	33.00	42.50
3 1/4	....	....	....	12.90	14.40	20.00	23.90	27.65	35.25	45.35
3 1/2	....	....	....	13.80	15.40	21.65	25.65	29.65	37.50	48.15
3 3/4	....	....	....	14.75	16.40	23.25	27.45	31.65	39.75	50.95
4	....	....	....	15.65	17.40	24.90	29.25	33.65	42.00	53.75
4 1/4	....	....	....	....	18.40	26.50	31.10	35.65	44.25	56.55
4 1/2	....	....	....	....	19.40	28.15	33.90	37.65	46.50	59.40
4 3/4	....	....	....	....	....	....	36.70	39.65	48.75	62.20
5	....	....	....	....	....	....	39.50	41.65	51.00	65.00

ROUND AND FILLISTER HEAD CAP SCREWS

ROUND HEAD

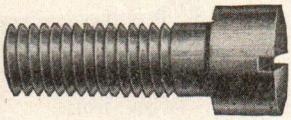


Fig. 458A

FILLISTER HEAD

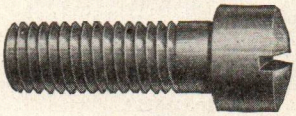


Fig. 458B

PRICE, PER HUNDRED

Diameter of Head Inches	3/16	1/4	3/8	7/16	9/16	5/8	3/4	13/16	7/8	1	1 1/8	1 1/4
Length of Head Inches	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Diameter of Screw Inches	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Length under Head to Extreme Point, Inches												
3/4	2.00	2.25	2.50	3.00	3.50	4.00	5.00	....	....	....	....	....
1	2.25	2.50	2.75	3.25	3.75	4.25	5.30	6.60	....	....	....	....
1 1/4	2.50	2.75	3.00	3.50	4.00	4.50	5.60	6.90	9.00	....	....	....
1 1/2	2.75	3.00	3.25	3.75	4.25	4.75	5.90	7.20	9.50	12.00	....	....
1 3/4	3.00	3.25	3.50	4.00	4.50	5.00	6.20	7.50	10.00	12.50	15.25	....
2	3.25	3.50	3.75	4.35	5.00	5.50	6.75	8.00	10.75	13.00	16.00	19.20
2 1/4	3.50	3.75	4.00	4.75	5.50	6.00	7.25	8.50	11.50	13.75	16.75	20.20
2 1/2	3.75	4.00	4.25	5.15	6.00	6.50	7.75	9.00	12.00	14.50	17.50	21.25
2 3/4	4.00	4.25	4.50	5.55	6.50	7.00	8.25	9.50	12.75	15.25	18.30	22.40
3	4.25	4.50	4.75	5.95	7.00	7.50	8.75	10.00	13.50	16.00	19.10	23.60
3 1/4	...	4.75	5.00	6.35	7.50	8.00	9.25	10.50	14.25	16.75	20.00	24.85
3 1/2	...	...	5.25	6.75	8.00	8.50	9.75	11.00	15.00	17.50	21.00	26.10
3 3/4	...	...	...	7.15	8.50	9.00	10.25	11.50	15.75	18.25	22.00	27.35
4	...	...	...	...	9.00	9.50	10.75	12.00	16.50	19.00	23.00	28.60
4 1/4	...	...	...	...	...	10.00	11.25	12.50	17.25	19.75	24.00	29.85
4 1/2	...	...	...	...	...	....	11.75	13.00	18.00	20.50	25.00	31.10
4 3/4	...	...	...	...	...	....	12.25	13.50	18.75	21.25	26.00	32.35
5	...	...	...	...	...	....	12.75	14.00	19.50	22.00	27.00	33.60
5 1/4	...	...	...	...	...	....	13.25	14.50	20.25	22.75	28.00	34.85
5 1/2	...	...	...	...	...	....	13.75	15.00	21.00	23.50	29.00	36.10
5 3/4	...	...	...	...	...	....	14.25	15.50	21.75	24.25	30.00	37.35
6	...	...	...	...	...	....	14.75	16.00	22.50	25.00	31.00	38.60
Threads to inch	40	24	20	18	16	14	12	12	11	10	9	8

Round heads made to order only.

"HALLOWELL" HOLLOW HEAD CAP SCREWS

FILLISTER HEAD

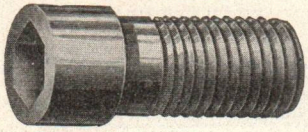


Fig. 19011A

FLAT HEAD

Fig. 19011B

As no clearance is required around the head of the "Hallowell" Fillister, this in turn permits the flanges and adjoining parts of machinery being made much thinner and narrower, permitting reduced weight, consequently a saving in cost amounting in many cases to more than pay for the full cost of screws used. The convenience, efficiency, durability and low price of the "Hallowell" Fillister recommends its use for any place where either a hexagon or fillister head cap screw is now being used.

ORDINARY FILLISTER HEAD CAP SCREWS

BEFORE AND AFTER USING SCREWDRIVER

BEFORE

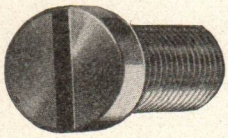


Fig. 19011C

AFTER

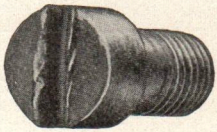


Fig. 19011D

The "before" and "after" illustrations have reference to the originally clean-cut slot in the ordinary fillister head cap screw. The slot gets battered up and broken down by using the common screwdriver in tightening it up and backing it off. The destruction is seen in above illustration. In a short while the screw is useless, as it becomes impossible to properly engage the screwdriver in the irregularly widened slot. To overcome this serious objection we are now prepared to furnish the "Hallowell" Fillister Head Cap Screw, as shown in above. In the "Hallowell" Fillister the slot is done away with and a hexagonal hole substituted, as shown. This fits the same kind of wrench as is now in common use for hollow set screws.

Contrary to the slotted head screws, the "Hallowell" Fillister can be pulled up as tight as hexagon head cap screws.

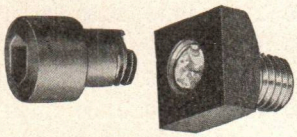


Fig. 19011E

Referring to the illustration. The square nut was held in a vise. The "Hallowell" was then screwed into it and tightened up, by means of its wrench, until it was twisted off, as shown. Neither the hollow head nor the wrench showed the least effect of this extreme test.

The cost of wrenches for the "Hallowell" Fillister is a mere trifle as compared with any other wrench or screwdriver.

Hollow flat head cap screws are made in sizes of ⅜ to ⅝ inch in diameter; ¾ to 3½ inches long, inclusive. The hexagon hole takes the place of the screwdriver slot. By inserting a hexagon bar wrench the screw can be tightened up much harder than with a screwdriver, without battering up the hole. Specially suitable for disc grinders and like machines.

"HALLOWELL" HOLLOW HEAD CAP SCREWS

FILLISTER HEAD—PRICE, PER HUNDRED

One Plain Wrench Packed in Each Box

Diam. of Head.....inches	7/16	9/16	5/8	3/4	13/16	7/8	1
Length of Head.....inches	5/16	3/8	7/16	1/2	9/16	5/8	3/4
U. S. S. Threads.....per inch	18	16	14	13	12	11	10
Diam. of Screw.....inches	5/16	3/8	7/16	1/2	9/16	5/8	3/4
Length, Inches: 3/4	3.00	3.50	4.00	5.00	....	....	....
1	3.25	3.75	4.25	5.30	6.60	....	....
1 1/4	3.50	4.00	4.50	5.60	6.90	9.00	....
1 1/2	3.75	4.25	4.75	5.90	7.20	9.50	12.00
1 3/4	4.00	4.50	5.00	6.20	7.50	10.00	12.50
2	4.35	5.00	5.50	6.75	8.00	10.75	13.00
2 1/4	4.75	5.50	6.00	7.25	8.50	11.50	13.75
2 1/2	5.15	6.00	6.50	7.75	9.00	12.00	14.50
2 3/4	5.55	6.50	7.00	8.25	9.50	12.75	15.25
3	5.95	7.00	7.50	8.75	10.00	13.50	16.00
3 1/4	....	7.50	8.00	9.25	10.50	14.25	16.75
3 1/2	....	8.00	8.50	9.75	11.00	15.00	17.50

The length of thread equals three fourths the length of body.

FLAT HEAD—PRICE, PER HUNDRED

Length Inches	Diameter, Inches				
	3/8	7/16	1/2	9/16	5/8
3/4	....	....	....	....	....
1	....	....	....	....	....
1 1/4	....	....	....	....	....
1 1/2	....	....	....	....	....
1 3/4	....	....	....	....	....
2	....	....	....	....	....
2 1/4	....	....	....	....	....
2 1/2	....	....	....	....	....
2 3/4	....	....	....	....	....
3	....	....	....	....	....
3 1/4	....	....	....	....	....
3 1/2	....	....	....	....	....

HARDENED WRENCHES

PLAIN

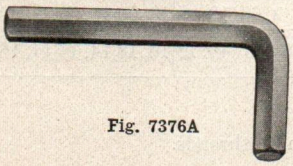


Fig. 7376A

WITH HANDLE

Fig. 7376B

For Cap Screws.....inches	5/16	3/8 and 7/16	1/2 and 9/16	5/8 and 3/4
Price, Plain.....per 100	1.75	2.30	3.50	4.90
" with Handle..... "	15.00	17.00	19.00	23.00

IRON MACHINE SCREWS

FLAT, ROUND AND FILLISTER HEADS

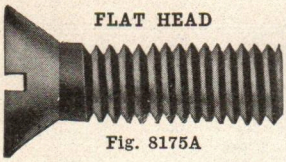


Fig. 8175A

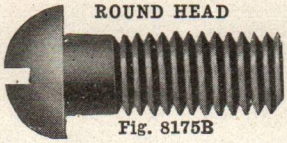


Fig. 8175B

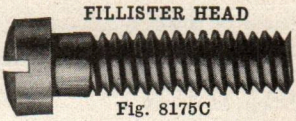


Fig. 8175C

PRICE, PER GROSS

Length, Inches — No.	2 and 3	4	5 and 6	7 and 8	9 and 10	12	14	16	18	20	24	28	30	34
1/8	.30	.30	.35	.40	....	....	....	....	....	.....	.....	.....	.....	.....
3/16	.30	.30	.35	.40	.60	....	....	....	....	.....	.....	.....	.....	.....
1/4	.30	.30	.35	.40	.60	.70	.85	....	....	.....	.....	.....	.....	.....
5/16	.32	.32	.37	.44	.65	.75	.90	1.15	....	.....	.....	.....	.....	.....
3/8	.32	.32	.37	.44	.65	.75	.90	1.15	1.50	1.90	2.30	.....	.....	.....
7/16	.34	.34	.39	.48	.70	.80	.95	1.20	1.60	2.00	2.40	.....	.....	.....
1/2	.34	.34	.39	.48	.70	.80	.95	1.20	1.60	2.00	2.40	.....	.....	.....
9/16	.37	.37	.42	.52	.75	.85	1.00	1.25	1.70	2.10	2.50	.....	.....	.....
5/8	.37	.37	.42	.52	.75	.85	1.00	1.25	1.70	2.10	2.50	.....	.....	.....
11/16	.41	.41	.46	....	....	....	....	....	....	.....	.....	.....	.....	.....
3/4	.41	.41	.46	.56	.80	.90	1.05	1.30	1.80	2.20	2.60	3.20	4.00	5.10
13/16	.45	.45	.50	....	....	....	....	....	....	.....	.....	.....	.....	.....
7/8	.45	.45	.50	.60	.85	.95	1.15	1.40	1.90	2.30	2.70	3.30	4.25	5.85
15/16	...	.50	.55	....	....	....	....	....	....	.....	.....	.....	.....	.....
1	...	.50	.55	.65	.90	1.00	1.25	1.50	2.00	2.40	2.80	3.75	4.50	6.60
1 1/8	...	.55	.60	.70	1.00	1.10	1.35	1.60	2.20	2.60	3.00	4.00	5.00	7.00
1 1/4	...	.60	.65	.75	1.10	1.20	1.45	1.75	2.40	2.80	3.20	4.35	5.25	7.35
1 3/8	...	.65	.70	.80	1.20	1.30	1.55	1.90	2.60	3.00	3.40	4.80	5.75	8.00
1 1/2	...	.70	.75	.85	1.30	1.40	1.65	2.10	2.80	3.20	3.60	5.10	6.00	8.00
1 5/8	...	.80	.85	.95	1.40	1.50	1.75	2.30	3.00	3.40	3.80	5.70	6.35	.....
1 3/4	...	.90	.95	1.05	1.50	1.60	1.85	2.50	3.20	3.60	4.20	5.70	6.65	8.60
1 7/8	...	1.00	1.05	1.15	1.60	1.70	2.00	2.70	3.40	3.80	4.40	6.35	7.00	.....
2	...	1.10	1.15	1.25	1.70	1.80	2.20	2.90	3.60	4.00	4.60	6.35	7.35	9.40
2 1/4	...	....	1.25	1.45	1.90	2.20	2.60	3.30	4.00	4.40	4.80	6.90	8.00	10.30
2 1/2	...	....	....	1.65	2.20	2.50	2.80	3.50	4.40	4.90	5.30	7.75	8.90	11.50
2 3/4	...	....	....	1.90	2.50	2.90	3.20	4.00	4.90	5.40	5.90	8.60	9.85	.....
3	...	....	....	2.30	2.90	3.50	3.80	4.50	5.60	6.00	7.40	9.70	11.00	.....
3 1/4	...	....	....	....	3.30	4.25	4.50	5.50	6.50	7.00	8.80	11.50	13.00	.....
3 1/2	...	....	....	....	3.75	5.00	5.25	6.50	7.50	8.25	10.10	13.20	15.00	.....
3 3/4	...	....	....	....	....	....	6.00	7.50	8.50	9.25	12.20	14.70	17.50	.....
4	...	....	....	....	....	....	6.75	8.50	9.60	10.25	13.50	16.50	20.50	.....
Threads	*48 56	32, 36 40	**30 32,36,40	30, 32 †36	24, 30 32	20, 24	20, 24	16, 18, 20		16, 18	16, 18	14, 16	14, 16	12, 13

*No. 2 not made in 48 threads.

**No. 5 not made in 30 threads. No. 6 not made in 40 threads.

†No. 7 not made in 36 threads.

On machine screws, made to order, differing in length, size, thread, or head, from regular standard flat, round and fillister head screws, special prices will be quoted upon application.

BRASS MACHINE SCREWS

FLAT, ROUND AND FILLISTER HEADS

Fig. 185A

Fig. 185B

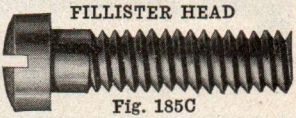


Fig. 185C

PRICE, PER GROSS

No.	2 and 3	4	5 and 6	7 and 8	9 and 10	12	14	16	18	20	24	28	30	34
Length, Inches: 1/8	.32	.36	.46	.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3/16	.32	.36	.46	.70	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
1/4	.32	.36	.46	.70	1.00	1.25	1.65	.....	.....	.....	.....	.....	.....	.....
5/16	.34	.38	.49	.75	1.05	1.35	1.75	.....	.....	.....	.....	.....	.....	.....
3/8	.36	.40	.52	.80	1.10	1.45	1.85	2.90	3.70	4.60	5.50	.....	.....	.....
7/16	.38	.42	.55	.85	1.15	1.55	2.00	3.05	3.90	4.80	5.60	.....	.....	.....
1/2	.40	.44	.58	.90	1.25	1.65	2.15	3.20	4.10	5.00	5.75	.....	.....	.....
9/16	.43	.47	.62	.95	1.35	1.75	2.30	3.35	4.30	5.25	6.30	.....	.....	.....
5/8	.46	.50	.66	1.00	1.45	1.85	2.45	3.50	4.50	5.50	6.50	.....	.....	.....
11/16	.49	.53	.70	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3/4	.52	.56	.74	1.10	1.65	2.05	2.75	3.80	4.90	6.00	6.70	.....	.....	15.75
13/16	.55	.59	.78	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7/8	.58	.62	.82	1.20	1.85	2.25	3.05	4.10	5.30	6.50	7.40	11.25	.....	17.10
15/16	...	.65	.86	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	...	.70	.90	1.30	2.05	2.45	3.35	4.40	5.70	7.00	8.50	13.00	15.75	18.50
1 1/8	...	.80	1.05	1.45	2.20	2.65	3.55	4.65	6.00	7.50	9.00	.....	.....	.....
1 1/4	...	.90	1.20	1.60	2.35	2.85	3.75	4.90	6.30	8.00	9.90	15.40	18.75	22.10
1 3/8	...	1.00	1.35	1.75	2.50	3.05	3.95	5.20	6.60	8.50	11.50	.....	.....	.....
1 1/2	...	1.10	1.50	1.90	2.65	3.25	4.15	5.50	6.90	9.00	12.00	18.35	22.50	26.65
1 5/8	...	1.25	1.70	2.10	2.85	3.50	4.40	5.85	7.30	9.50	.....	.....	.....	.....
1 3/4	...	1.40	1.90	2.30	3.05	3.75	4.65	6.20	7.70	10.00	12.70	20.40	24.25	28.10
1 7/8	...	1.55	2.10	2.50	3.25	4.00	4.90	6.60	8.10	10.50	.....	.....	.....	.....
2	...	1.70	2.30	2.70	3.45	4.25	5.15	7.00	8.60	11.00	13.50	21.80	26.00	30.20
2 1/4	...	....	2.70	3.10	3.85	4.75	5.65	8.00	9.75	12.00	14.90	23.05	28.00	32.95
2 1/2	...	....	....	....	4.65	5.80	6.80	9.00	10.50	13.50	15.50	25.35	30.50	35.65
2 3/4	...	....	....	....	6.00	7.00	8.00	10.00	12.50	15.00	17.00	27.50	33.00	.....
3	...	....	....	....	7.50	8.50	9.50	11.00	15.00	16.50	19.00	29.50	36.00	.....
3 1/4	...	....	....	....	9.00	10.50	11.50	15.00	17.50	18.50	22.50	33.75	39.50	.....
3 1/2	...	....	....	....	11.00	12.50	15.00	18.00	19.50	22.00	25.50	37.50	42.75	.....
3 3/4	...	....	....	....	13.50	15.00	18.50	20.00	22.50	25.00	28.00	40.25	46.60	.....
4	...	....	....	....	16.50	18.00	22.00	25.00	26.50	28.00	32.00	44.25	49.50	.....
Threads	*48, 56	32, 36 40	**30,32 36, 40	30, 32 †36	24, 30 32	20, 24	20, 24	16, 18, 20	16, 18	16, 18	14, 16	14, 16	12, 13	

*No. 2 not made in 48 threads.

**No. 5 not made in 30 threads. No. 6 not made in 40 threads.

†No. 7 not made in 36 threads.

On machine screws, made to order, differing in length, size, thread, or head, from regular standard flat and round head screws, special prices will be quoted upon application. Brass fillister head screws to order only.

COACH AND HANGER SCREWS

GIMLET POINT COACH SCREW

Fig. 470A

HANGER SCREW

Fig. 470B

COACH AND LAG SCREWS—PRICE, PER HUNDRED

Adopted November 12, 1908

Length under Head Inches	Diameter of Screw, Inches							
	5/16	3/8	7/16	1/2	9/16, 5/8	3/4	7/8	1
1½	2.25	2.70	3.15	3.75	.....	.....	.....	.....
2	2.45	2.96	3.47	4.11	6.00	.....	.....	.....
2½	2.65	3.22	3.79	4.47	6.50	9.20	.....	.....
3	2.85	3.48	4.11	4.83	7.00	9.90	15.00	.....
3½	3.05	3.74	4.43	5.19	7.50	10.60	16.00	22.00
4	3.25	4.00	4.75	5.55	8.00	11.30	17.00	23.30
4½	3.45	4.26	5.07	5.91	8.50	12.00	18.00	24.60
5	3.65	4.52	5.39	6.27	9.00	12.70	19.00	25.90
5½	3.85	4.78	5.71	6.63	9.50	13.40	20.00	27.20
6	4.05	5.04	6.03	6.99	10.00	14.10	21.00	28.50
6½	4.25	5.30	6.35	7.35	10.50	14.80	22.00	29.80
7	4.45	5.56	6.67	7.71	11.00	15.50	23.00	31.10
7½	4.65	5.82	6.99	8.07	11.50	16.20	24.00	32.40
8	4.85	6.08	7.31	8.43	12.00	16.90	25.00	33.70
9	5.25	6.60	7.95	9.15	13.00	18.30	27.00	36.30
10	5.65	7.12	8.59	9.87	14.00	19.70	29.00	38.90
11	6.05	7.64	9.23	10.59	15.00	21.10	31.00	41.50
12	6.45	8.16	9.87	11.31	16.00	22.50	33.00	44.10

The following extras are to be understood as a part of this list.
Hexagon heads, 10 per cent extra. Tee heads, 20 per cent extra.
Skein screws sold at the same price as lag screws.

HANGER SCREWS—PRICE, PER HUNDRED

Adopted May 21, 1902

Length Inches	Diameter of Screw, Inches							
	1/4, 5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
2	3.00	3.60	4.24	5.06	6.19	.....	.....	.....
2½	3.19	3.83	4.54	5.44	6.75	9.90	.....	.....
3	3.38	4.05	4.84	5.81	7.31	10.73	.....	.....
3½	3.57	4.28	5.14	6.19	7.88	11.55	15.00	.....
4	3.75	4.50	5.44	6.56	8.44	12.38	16.00	.....
4½	3.94	4.73	5.74	6.94	9.00	13.20	17.00	.....
5	4.13	4.95	6.04	7.31	9.56	14.03	18.00	26.25
5½	4.32	5.18	6.34	7.69	10.13	14.85	19.00	27.50
6	4.50	5.40	6.64	8.06	10.69	15.68	20.00	28.75
6½	.....	5.62	6.94	8.43	11.25	16.50	21.00	30.00
7	.....	5.84	7.24	8.80	11.82	17.33	22.50	31.25
7½	.....	6.06	7.54	9.17	12.38	18.15	23.44	32.50
8	.....	6.28	7.84	9.55	12.95	19.03	24.37	33.75
9	.....	.....	8.14	9.92	13.51	19.85	26.25	35.62
10	.....	.....	.....	10.30	14.08	20.68	27.50	37.50
11	.....	.....	.....	.....	14.64	21.50	28.75	39.38
12	.....	.....	.....	.....	15.21	22.32	30.00	41.25

SQUARE AND HEXAGON NUTS

COLD PUNCHED, CHAMFERED AND TRIMMED WITH REAMED HOLES

SQUARE

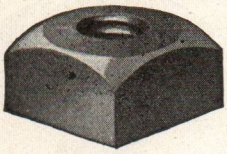


Fig. 1145A

HEXAGON

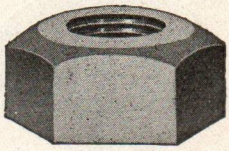


Fig. 1145B

U. S. STANDARD LIST

Adopted January 1, 1906

Width Inches	Thickness Inches	Hole Inches	Size of Bolt Inches	Square: Price in 200-pound Kegs Cents per Pound		Hexagon: Price in 200-pound Kegs Cents per Pound		Square: Average Number in One Keg		Hexagon: Average Number in One Keg	
				Blank	Tapped	Blank	Tapped	Blank	Tapped	Blank	Tapped
1/2	1/4	3/16	1/4	20.0	22.0	27.0	29.5	12600	13500	13800	14750
19/32	5/16	1/4	5/16	18.0	19.5	24.0	26.0	7600	8150	8933	9560
11/16	3/8	19/64	3/8	14.5	15.6	18.5	20.1	4600	4900	5500	5880
25/32	7/16	11/32	7/16	14.0	14.9	18.0	19.3	3000	3200	3760	3990
7/8	1/2	13/32	1/2	11.3	12.0	14.0	15.0	2320	2450	2650	2800
31/32	9/16	29/64	9/16	11.3	11.9	14.0	14.9	1660	1750	1993	2110
1 1/16	5/8	33/64	5/8	10.0	10.5	12.5	13.2	1200	1270	1440	1525
1 1/4	3/4	5/8	3/4	9.7	10.1	11.4	12.0	740	780	896	950
1 7/16	7/8	47/64	7/8	9.6	10.0	11.1	11.7	480	500	567	600
1 5/8	1	27/32	1	9.6	10.0	11.1	11.7	344	365	408	435
1 13/16	1 1/8	15/16	1 1/8	9.6	10.0	11.1	11.7	244	260	296	313
2	1 1/4	1 1/16	1 1/4	10.1	10.5	11.5	12.1	180	192	208	220
2 3/16	1 3/8	1 5/32	1 3/8	10.3	10.8	12.0	12.7	150	160	164	175
2 3/8	1 1/2	1 9/32	1 1/2	10.7	11.3	12.6	13.4	112	120	132	140
2 9/16	1 5/8	1 13/32	1 5/8	11.1	11.8	13.2	14.1	96	100	108	115
2 3/4	1 3/4	1 1/2	1 3/4	11.5	12.2	14.0	14.9	72	77	88	93
2 15/16	1 7/8	1 5/8	1 7/8	12.0	12.8	14.5	15.5	56	59	71	75
3 1/8	2	1 23/32	2	12.0	12.9	14.5	15.6	48	50	60	64
3 5/16	2 1/8	1 13/16	2 1/8	12.5	13.5	15.0	16.2	40	42	52	55
3 1/2	2 1/4	1 15/16	2 1/4	12.5	13.6	15.0	16.3	32	33	46	48
3 11/16	2 3/8	2 1/16	2 3/8	13.5	14.7	16.0	17.4	30	31	38	40
3 7/8	2 1/2	2 3/16	2 1/2	13.5	14.8	16.0	17.5	27	28	31	32
4 1/16	2 5/8	2 5/16	2 5/8	14.0	15.4	16.5	18.1	20	21	28	29
4 1/4	2 3/4	2 7/16	2 3/4	14.0	15.4	16.5	18.1	17	18	26	27
4 5/8	3	2 5/8	3	14.5	16.0	17.0	18.7	14	15	17	18
5	3 1/4	2 15/16	3 1/4	14.5	16.1	17.0	18.8	13	14	14	14
5 3/8	3 1/2	3 3/32	3 1/2	14.5	16.2	17.0	18.9	9	10	11	11
6 1/8	4	3 9/16	4	15.5	17.5	18.0	20.0	5	5	8	8

For less than keg lots (200 pounds) of a size, add 20 cents per cwt. for 100 pounds or over 50 cents per cwt. for less than 100 pounds.

U. S. STANDARD HOT PRESSED NUTS

SQUARE

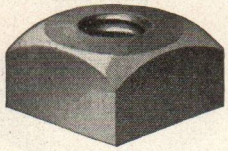


Fig. 1143A

HEXAGON

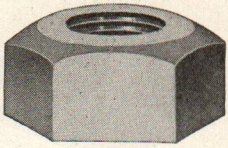


Fig. 1143B

STANDARD LIST

Adopted January 1, 1906

Width Inches	Thickness Inches	Hole Inches	Size of Bolt Inches	Square Average Number in One Keg Blank	Square Average Number in One Keg Tapped	Hexagon Average Number in One Keg Blank	Hexagon Average Number in One Keg Tapped	Square Price in 200-Pounds Kegs Cents per Pound Blank	Square Price in 200-Pounds Kegs Cents per Pound Tapped	Hexagon Price in 200-pound Kegs Cents per Pound Blank	Hexagon Price in 200-pound Kegs Cents per Pound Tapped
1/2	1/4	3/16	1/4	13800	14760	17400	18600	13.	15.	20.	22.5
19/32	5/16	1/4	5/16	7400	7917	9200	9760	12.	13.5	18.	20.
11/16	3/8	19/64	3/8	5000	5320	6000	6400	10.5	11.6	14.	15.6
25/32	7/16	11/32	7/16	3200	3400	4000	4250	10.	10.9	13.	14.3
7/8	1/2	13/32	1/2	2400	2540	3000	3200	9.	9.7	11.2	12.2
31/32	9/16	29/64	9/16	1600	1690	2128	2275	9.	9.6	11.2	12.1
1 1/16	5/8	33/64	5/8	1360	1440	1540	1630	8.7	9.2	10.5	11.2
1 1/4	3/4	5/8	3/4	832	880	998	1050	8.5	8.9	10.	10.6
1 7/16	7/8	47/64	7/8	544	578	628	665	8.4	8.8	9.9	10.5
1 5/8	1	27/32	1	376	397	436	460	8.4	8.8	9.9	10.5
1 1/8	1 1/8	15/16	1 1/8	268	284	288	304	8.4	8.8	9.9	10.5
1 13/16	1 1/4	1 1/16	1 1/4	206	220	250	260	8.4	8.8	9.9	10.5
2	1 3/8	1 5/32	1 3/8	146	157	182	190	8.5	9.	10.	10.7
2 3/16	1 1/2	1 9/32	1 1/2	120	127	144	150	8.8	9.4	10.3	11.1
2 3/8	1 5/8	1 13/32	1 5/8	95	100	116	120	9.	9.7	10.5	11.4
2 9/16	1 3/4	1 1/2	1 3/4	74	77	95	100	9.3	10.	10.8	11.7
2 15/16	1 7/8	1 5/8	1 7/8	64	67	80	84	9.5	10.3	11.	12.
3 1/8	2	1 23/32	2	53	56	62	65	9.7	10.6	11.2	12.3
3 5/16	2 1/8	1 5/8	2 1/8	43	45	52	54	10.	11.	11.7	12.9
3 1/2	2 1/4	1 15/16	2 1/4	36	37	44	46	10.	11.1	11.7	13.
3 11/16	2 3/8	2 1/16	2 3/8	28	29	35	36	10.3	11.5	12.2	13.6
3 7/8	2 1/2	2 11/64	2 1/2	24	25	32	33	10.5	11.8	12.4	13.9
4 1/4	2 3/4	2 27/64	2 3/4	21	22	27	27	11.	12.4	13.	14.6
4 5/8	3	2 5/8	3	16	17	18	18	11.5	13.	13.5	15.2

When ordering, please state whether nuts are to be blank or tapped. For quantities less than 200 pounds of a size, the, following extras will be charged: At the rate of 20 cents per 100 pounds for 100 nuts or more. At the rate of 50 cents per 100 pounds for less than 100 pounds.

S. A. E. SEMIFINISHED NUTS

PLAIN

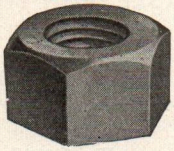


Fig. 8794A

CASTLE

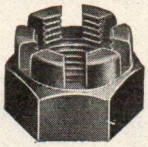


Fig. 8794B

PLAIN NUTS

Dimensions Adopted by Society of Automobile Engineers

Screw Diameter Inches	Pitch of Thread	Thickness of Nut Inches	Diameter Across Flats Inches	Diameter of Facing Inches	Depth of Facing Inches
1/4	28	7/32	7/16	7/16	1/64
5/16	24	17/64	1/2	1/2	1/64
3/8	24	21/64	9/16	9/16	1/64
7/16	20	3/8	5/8	5/8	1/64
1/2	20	7/16	3/4	3/4	1/64
9/16	18	31/64	7/8	7/8	1/64
5/8	18	35/64	15/16	15/16	1/64
11/16	16	19/32	1	1	1/64
3/4	16	21/32	1 1/16	1 1/16	1/64
7/8	14	49/64	1 1/4	1 1/4	1/64
1	14	7/8	1 7/16	1 7/16	1/64
1 1/8	12	63/64	1 5/8	1 5/8	1/64
1 1/4	12	1 3/32	1 13/16	1 13/16	1/64
1 3/8	12	1 13/64	2	2	1/64
1 1/2	12	1 5/16	2 3/16	2 3/16	1/64

CASTLE NUTS

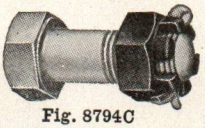


Fig. 8794C

Dimensions Adopted by Society of Automobile Engineers

Screw Diam. Inches	Pitch of Thread	Total Thickness Inches	Height of Castle Inches	Diam. of Nut Across Flats Inches	Diam. of Castle Inches	Diam. of Facing Inches	Depth of Facing Inches	No. of Slots in Castle	Depth of Slots in Castle Inches	Width of Slots in Castle Inches	Diam. of Cotter Pin used Inches
1/4	28	9/32	3/32	7/16	7/16	7/16	1/64	6	3/32	5/64	1/16
5/16	24	21/64	3/32	1/2	1/2	1/2	1/64	6	3/32	5/64	1/16
3/8	24	13/32	1/8	9/16	9/16	9/16	1/64	6	1/8	1/8	3/32
7/16	20	29/64	1/8	5/8	5/8	5/8	1/64	6	1/8	1/8	3/32
1/2	20	9/16	3/16	3/4	3/4	3/4	1/64	6	3/16	1/8	3/32
9/16	18	39/64	3/16	7/8	7/8	7/8	1/64	6	3/16	5/32	1/8
5/8	18	23/32	1/4	15/16	15/16	15/16	1/64	6	1/4	5/32	1/8
11/16	16	49/64	1/4	1	1	1	1/64	6	1/4	5/32	1/8
3/4	16	13/16	1/4	1 1/16	1 1/16	1 1/16	1/64	6	1/4	5/32	1/8
7/8	14	29/32	1/4	1 1/4	1 1/4	1 1/4	1/64	6	1/4	5/32	1/8
1	14	1	1/4	1 7/16	1 7/16	1 7/16	1/64	6	1/4	5/32	1/8
1 1/8	12	1 5/32	5/16	1 5/8	1 5/8	1 5/8	1/64	6	5/16	7/32	3/16
1 1/4	12	1 1/4	5/16	1 13/16	1 13/16	1 13/16	1/64	6	5/16	7/32	3/16
1 3/8	12	1 13/32	3/8	2	2	2	1/64	6	3/8	1/4	3/16
1 1/2	12	1 1/2	3/8	2 3/16	2 3/16	2 3/16	1/64	6	3/8	1/4	3/16

Prices on application.

MACHINE SCREW NUTS AND THUMB NUTS

MACHINE SCREW NUTS

SQUARE

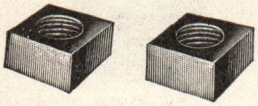


Fig. 13176A

EFFECTIVE JAN. 1, 1901

Price, per Gross					
Iron			Brass		
No.	Thread	Price	No.	Thread	Price
4	32, 36, 40	.23	4	32, 36, 40	.72
6	30, 32, 36	.23	6	30, 32, 36	.72
8	30, 32, 36	.26	8	30, 32, 36	.80
10	24, 30, 32	.29	10	24, 30, 32	.87
12	20, 24	.32	12	20, 24	.94
14	18, 20, 24	.36	14	18, 20, 24	1.08
16	16, 18, 20	.48	16	16, 18, 20	1.44
18	16, 18, 20	.62	18	16, 18, 20	1.88
20	16, 18	.82	20	16, 18	2.45
22	16, 18	.93	22	16, 18	2.70
24	14, 16, 18	1.06	24	14, 16, 18	3.17
26	14, 16	1.20	26	14, 16	3.60
28	14, 16	1.35	28	14, 16	4.10
30	14, 16	1.50	30	14, 16	4.55

HEXAGON

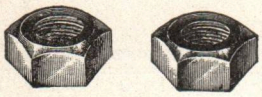


Fig. 13176B

Iron			Brass		
No.	Thread	Price	No.	Thread	Price
4	32, 36, 40	.36	4	32, 36, 40	1.08
6	30, 32, 36	.36	6	30, 32, 36	1.08
8	30, 32, 36	.40	8	30, 32, 36	1.22
10	24, 30, 32	.43	10	24, 30, 32	1.30
12	20, 24	.48	12	20, 24	1.44
14	18, 20, 24	.55	14	18, 20, 24	1.66
16	16, 18, 20	.72	16	16, 18, 20	2.16
18	16, 18, 20	.94	18	16, 18, 20	2.81
20	16, 18	1.22	20	16, 18	3.67
22	16, 18	1.44	22	16, 18	4.32
24	14, 16, 18	1.58	24	14, 16, 18	4.75
26	14, 16	1.80	26	14, 16	5.40
28	14, 16	2.02	28	14, 16	6.05
30	14, 16	2.30	30	14, 16	6.91

MALLEABLE IRON THUMB NUTS

THREADED

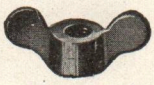


Fig. 13176C

Size Inches	Threads per Inch	Price per 100	Size Inches	Threads per Inch	Price per 100
3/16	24	1.10	3/8	16	2.15
1/4	20	1.30	7/16	14	2.75
5/16	18	1.60	1/2	13	3.70

MALLEABLE IRON THUMB SCREWS

THREADED

Fig. 13176D

Length Under Head Inches	Price, per 100 — Diameter, Inches 3/16	1/4	5/16
1/2	1.20	1.50	2.00
3/4	1.45	1.80	2.35
1	1.70	2.10	2.70
1 1/4	1.95	2.40	3.05
1 1/2	2.20	2.70	3.40
2	2.80	3.30	4.10
2 1/2	....	4.30	5.20
3	....	5.30	6.30

Length Under Head Inches	Price, per 100 — Diameter, Inches 3/8	7/16	1/2
1/2	2.70	....	....
3/4	3.00	....	....
1	3.40	4.60	5.80
1 1/4	3.80	5.20	6.50
1 1/2	4.20	5.80	7.20
2	5.00	7.00	8.60
2 1/2	6.20	8.60	10.40
3	7.40	10.20	12.20

U. S. Standard Threads furnished; other threads supplied to order.

WASHERS

WROUGHT IRON

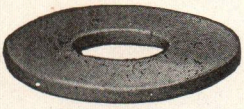


Fig. 7749A

CAST IRON

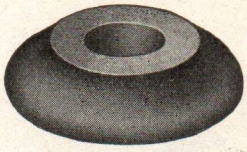


Fig. 7749B

WROUGHT IRON

U. S. Standard Sizes—In Effect January 20, 1910

Diameter Inches	Size of Hole Inches	Thickness of Wire Gauge Number	Size of Bolt Inches	Price, per Pound in 200-pound Kegs	Number of Washers in 100 Pounds
9/16	1/4	18	3/16	14.00	39400
3/4	5/16	16	1/4	12.20	15600
7/8	3/8	16	5/16	11.40	11250
1	7/16	14	3/8	10.50	6800
1 1/4	1/2	14	7/16	9.80	4300
1 3/8	9/16	12	1/2	9.40	2600
1 1/2	5/8	12	9/16	9.30	2250
1 3/4	11/16	10	5/8	9.20	1300
2	13/16	9	3/4	9.10	900
2 1/4	15/16	8	7/8	9.00	782
2 1/2	1 1/16	8	1	9.00	568
2 3/4	1 1/4	8	1 1/8	9.00	473
3	1 3/8	8	1 1/4	9.20	364
3 1/4	1 1/2	7	1 3/8	9.20	275
3 1/2	1 5/8	7	1 1/2	9.20	256
3 3/4	1 3/4	7	1 5/8	9.50	220
4	1 7/8	7	1 3/4	9.50	197
4 1/4	2	7	1 7/8	9.50	174
4 1/2	2 1/8	7	2	9.50	160
4 3/4	2 3/8	5	2 1/4	10.50	122
5	2 5/8	4	2 1/2	10.50	106

The above list prices apply only to full keg lots (200 pounds) of a size. For less than 200 pounds of a size, or for special packing, the following extras will be charged, viz.:

At the rate of .10 per 100 pounds for packing in 100-pound kegs.
" " " " .20 " " " " " " 50 to 100-pound boxes.
" " " " .30 " " " " " " 25 " 50 " "
" " " " .50 " " " " " " 5-pound boxes.
" " " " 1.00 " " " " " " 1 " "

CAST IRON

Diameter Inches	Size of Hole Inches	Thickness Inches	Size of Bolt Inches	Weight Pounds
2 1/2	5/8	11/16	1/2	1/2
2 3/4	3/4	3/4	5/8	5/8
3	7/8	13/16	3/4	3/4
3 1/2	1	7/8	7/8	1 1/4
4	1 1/8	15/16	1	1 5/8
4 1/2	1 1/4	1	1 1/8	2 1/4
5	1 3/8	1 1/8	1 1/4	3
6	1 3/4	1 1/4	1 1/2	5

MALLEABLE IRON WASHERS

WITH POSITIVE NUT LOCK

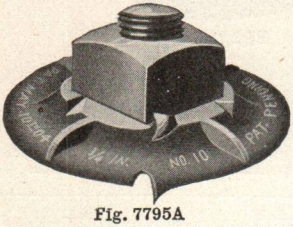


Fig. 7795A

Fig. 7795B

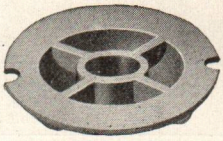


Fig. 7795C

These washers are made of malleable iron as a substitute for the common, old style cast iron washers, with same diameter of bearing surface as cast washers, but about one half the thickness; thereby can be sold cheaper per washer than cast washers, besides producing a much stronger washer, saving 66⅔ per cent of freight rates, hauling and weight to structure, also one half to one inch in length of bolts, and adding the best nut locking feature ever invented, without additional expense to the purchaser.

The nut locking features are molded and cast in washers without additional cost, and in no way interferes with the use of the washer as a plain washer, but is always ready to be used to lock nut when desired.

When nut is turned up on bolt, place the point of a cold chisel in any one of the beveled slots and with one blow of hammer you will turn up a "burr" or "obstruction," as shown, which will effectually lock the nut. Then give any one of the corners on outer edge of washer a blow with hammer (the assistance of a punch may be preferred); this will bend the corner into the wood, thereby preventing washer from turning and creating a most reliable and positive nut locking device.

To unlock nut, simply flatten the burr with blow from hammer (should this injure burr, for next occasion use any of the other slots).

To lock this washer when used on iron plates, instead of wood, use a pointed chisel and turn up a burr on the plate in one of the outer recesses of washer.

Size of Bolt Hole Inches	Diameter, Inches Western Pattern No. 10	Diameter, Inches Eastern Pattern No. 44	Thickness, Inches Western Pattern No. 10	Thickness, Inches Eastern Pattern No. 44	Comparative Weight, Pounds per 100 Washers: Western Pattern No. 10 Malleable Iron	Western Pattern No. 10 Cast Iron	Eastern Pattern No. 44 Malleable Iron	Eastern Pattern No. 44 Cast Iron
1/2	2 1/2	2	1/4	1/4	15	45	7	21
5/8	2 3/4	2 1/2	5/16	5/16	22	66	15	43
3/4	3	3	7/16	3/8	33	100	23	70
7/8	3 1/2	3 1/2	7/16	3/8	50	150	38	113
1	4	4	1/2	7/16	68	200	58	175
1 1/8	4 1/2	4 1/2	1/2	1/2	87	262	85	256
1 1/4	5	5	5/8	9/16	150	450	111	332
1 3/8	...	5 1/2	..	9/16	...	...	152	455
1 1/2	6	6	3/4	5/8	190	575	203	610
1 3/4	6	7	3/4	3/4	206	618	288	865
2	7 1/2	7 1/2	3/4	3/4	420	1262	372	1115

The Western Pattern No. 10 is the engineers' standard west of the Alleghenies. The Eastern Pattern No. 44 is the engineers' standard east of the Alleghenies.

POSITIVE LOCK WASHERS

STANDARD WASHERS

POSITIVE

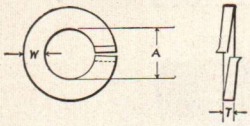


Fig. 11570A

The sizes given are standard factory stock sizes. In ordering, state pattern and size of steel desired.

PLAIN

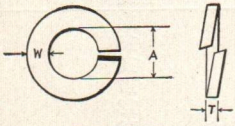


Fig. 11570B

Size Bolt "A" Inches	Size Steel Inches Width		Thickness	Price, per 1000 Positive	Price, per 1000 Plain
3/16	3/32	x	1/32	1.50	.75
3/16	3/32	x	3/64	1.65	.90
3/16	1/8	x	1/16	2.15	1.50
1/4	3/32	x	3/64	1.90	1.25
1/4	1/8	x	1/32	2.10	1.35
1/4	1/8	x	1/16	2.30	1.70
5/16	3/32	x	3/32	2.70	2.10
5/16	1/8	x	3/64	2.40	1.80
5/16	1/8	x	1/16	2.60	1.95
3/8	3/32	x	3/32	3.00	2.35
3/8	1/8	x	1/16	3.00	2.35
3/8	5/32	x	1/16	3.30	2.64
3/8	3/16	x	3/32	4.50	3.85
7/16	1/8	x	3/32	3.80	3.20
7/16	5/32	x	1/16	3.70	3.05
7/16	3/16	x	3/32	4.80	4.20
1/2	1/8	x	3/32	4.15	3.50
1/2	5/32	x	1/16	4.15	3.50
1/2	3/16	x	1/16	4.40	3.75
1/2	3/16	x	3/32	5.55	4.95
9/16	3/16	x	1/16	4.80	4.20
9/16	3/16	x	3/32	5.65	5.00
5/8	3/16	x	1/16	5.25	4.60
5/8	3/16	x	3/32	6.15	5.50
5/8	1/4	x	1/8	10.40	9.80
5/8	3/4	x	3/16	15.00	14.40
3/4	3/16	x	3/32	7.15	6.50
3/4	1/4	x	3/32	10.50	9.90
3/4	1/4	x	1/8	11.90	11.25
3/4	5/16	x	3/16	20.75	20.00
7/8	1/4	x	3/32	11.65	11.00
7/8	1/4	x	1/8	13.00	12.40
7/8	1/4	x	3/16	18.90	18.25
7/8	1/4	x	1/4	23.25	22.50

S. A. E. WASHERS

POSITIVE

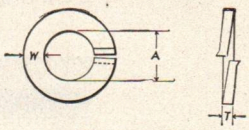


Fig. 11570C

The sizes given in plain pattern are the S. A. E. standard, both heavy and light.

PLAIN

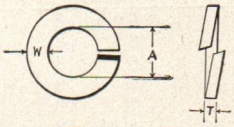


Fig. 11570D

HEAVY

Size Bolt "A" Inches	Size Steel Inches Width		Thickness	Price, per 1000 Positive	Price, per 1000 Plain
3/16	1/16	x	1/16	1.50	.75
1/4	5/64	x	5/64	2.10	1.50
5/16	1/8	x	1/8	3.55	2.95
3/8	1/8	x	1/8	3.90	3.30
7/16	11/64	x	11/64	6.60	6.00
1/2	11/64	x	11/64	7.30	6.70
9/16	13/64	x	13/64	10.30	9.70
5/8	13/64	x	13/64	10.60	10.00
11/16	1/4	x	1/4	19.55	18.80
3/4	1/4	x	1/4	20.75	20.00
7/8	17/64	x	17/64	23.25	22.50
1	5/16	x	5/16	38.10	37.35
1 1/8	5/16	x	5/16	40.70	39.70
1 1/4	3/8	x	3/8	73.70	71.70
1 3/8	3/8	x	3/8	78.70	76.70
1 1/2	7/16	x	7/16	99.35	93.25

LIGHT

3/16	1/16	x	3/64	1.40	.65
1/4	5/64	x	1/16	1.95	1.35
5/16	1/8	x	3/32	2.90	2.30
3/8	1/8	x	3/32	3.30	2.70
7/16	11/64	x	1/8	5.55	4.95
1/2	11/64	x	1/8	5.80	5.20
9/16	13/64	x	5/32	8.80	8.20
5/8	13/64	x	5/32	9.50	8.90
11/16	1/4	x	3/16	16.35	15.75
3/4	1/4	x	3/16	16.95	16.35
7/8	17/64	x	3/16	19.25	18.50
1	5/16	x	1/4	30.85	30.10
1 1/8	5/16	x	1/4	35.95	35.20
1 1/4	3/8	x	1/4	41.90	40.90
1 3/8	3/8	x	1/4	48.85	47.25
1 1/2	7/16	x	1/4	64.70	61.70

BOLT ENDS AND PLANER HEAD BOLTS

BOLT ENDS WITH SQUARE NUTS

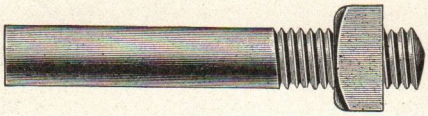


Fig. 13175A

Adopted February, 1895

Size of Iron Inches	Length Inches	Price, per Pound	Size of Iron Inches	Length Inches	Price, per Pound
3/16	6 and 8	.32	1 1/4	14	.11
1/4	6 " 8	.25	1 3/8	15	.11
5/16	6 " 8	.20	1 1/2	16	.11
3/8	7 " 10	.18	1 5/8	17	.12
7/16	7 " 10	.16	1 3/4	18	.12
1/2 and 9/16	8 " 12	.14	1 7/8	19	.12
5/8	9 " 12	.12	2	20	.12
3/4	10 " 12	.10	2 1/4	22	.14
7/8	11 " 12	.10	2 1/2	24	.14
1	12	.10	2 3/4	24	.16
1 1/8	13	.10	3	26	.18

Hexagon nuts, 10 per cent extra.

PLANER HEAD BOLTS

BOLT

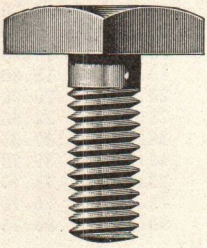


Fig. 13175B

BOLT WASHER

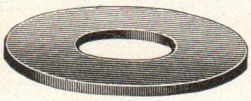


Fig. 13175C

BOLT NUT

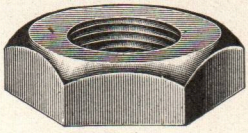


Fig. 13175D

Steel planer head bolts are made from special steel forgings, high tensile strength. All 12 threads to inch.

Diameter of Head ..... inches	7/8	1	1 1/8	1 1/8	1 1/4
Length of Head ..... inches	5/16	5/16	3/8	3/8	7/16
Diameter of Screw ..... "	1/2	9/16	5/8	11/16	3/4
Diameter of Washer ..... "	1 7/16	1 7/16	1 1/2	1 9/16	1 13/16
Thickness of Washer ..... "	1/16	1/16	1/16	1/16	3/32
Short Diameter of Nut ..... "	1 1/8	1 1/8	1 1/4	1 1/4	1 7/16
Thickness of Nut ..... "	3/8	3/8	3/8	3/8	1/2
Price, Bolts 1 in. under Head, per 100	25.00	.....	.....	.....	.....
" " 1 1/4 " " " "	26.50	30.00	33.50	33.50	42.50
" " 1 1/2 " " " "	26.50	30.50	35.00	35.00	44.00
" " 1 3/4 " " " "	.....	31.00	37.00	37.00	45.00
" " 2 " " " "	.....	34.50	39.50	39.50	47.50
" Washers ..... "	6.00	6.00	7.00	8.00	9.00
" Nuts ..... "	20.00	24.00	30.00	32.00	36.00

PLOW AND CULTIVATOR BOLTS

WITH FORGED NUTS

No. 1 KEY HEAD

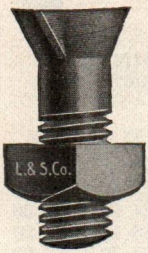


Fig. 26640A

No. 2 ROUND HEAD

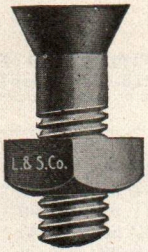


Fig. 26640B

No. 3 ROUND HEAD SQUARE SHANK

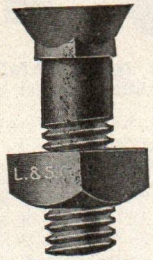


Fig. 26640C

No. 4 SQUARE HEAD

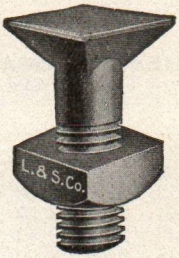


Fig. 26640D

No. 5 CUP HEAD

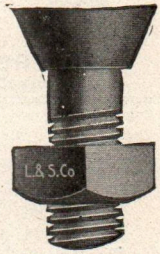


Fig. 26640E

No. 6 LARGE KEY HEAD

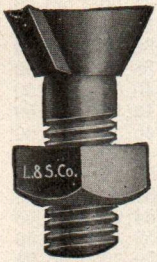


Fig. 26640F

No. 7 REVERSE KEY HEAD

Fig. 26640G

No. 8 CONCAVE HEAD

Fig. 26640H

No. 9 BUTTON HEAD

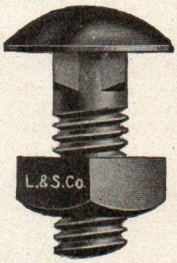


Fig. 26640J

No. 10 TEE HEAD

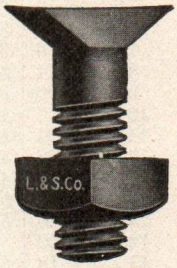


Fig. 26640K

In ordering plow bolts, specify the style heads desired. Right-hand threads always furnished unless left-hand are ordered.

Length Inches	Price, per Hundred						
	5/16	3/8	7/16	1/2	9/16	5/8	3/4
1 1/4	1.70	2.00	2.60	3.50	4.50	5.70	.....
1 1/2	1.80	2.10	2.75	3.70	4.75	6.00	10.50
1 3/4	1.90	2.20	2.90	3.90	5.00	6.30	10.85
2	2.00	2.30	3.05	4.10	5.25	6.60	11.20
2 1/4	2.10	2.40	3.20	4.30	5.50	6.90	11.55
2 1/2	2.20	2.50	3.35	4.50	5.75	7.20	11.90
2 3/4	2.30	2.60	3.50	4.70	6.00	7.50	12.25
3	2.40	2.70	3.65	4.90	6.25	7.80	12.60
3 1/4	2.50	2.80	3.80	5.10	6.50	8.10	12.95
3 1/2	2.60	2.90	3.95	5.30	6.75	8.40	13.30
3 3/4	2.70	3.00	4.10	5.50	7.00	8.70	13.65
4	2.80	3.10	4.25	5.70	7.25	9.00	14.00
4 1/2	3.00	3.30	4.55	6.10	7.75	9.60	14.70
Add for ea. in.	.40	.40	.60	.80	1.00	1.20	1.40

Left-hand threads, 10 per cent extra.

MACHINE BOLTS

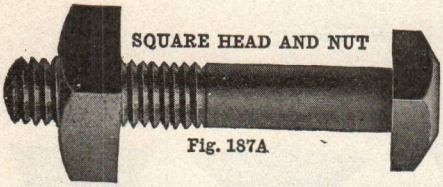


Fig. 187A

Fig. 187B

SQUARE HEADS, SQUARE NUTS AND FINISHED POINTS

Manufacturers' Standard List—In Effect August 1, 1912—Price, per Hundred

Length Inches	Diameter, Inches										
	1/4	5/16	3/8	7/16	1/2	9/16 & 5/8	3/4	7/8	1	1 1/8	1 1/4
3/4 to 1 1/2	1.70	2.00	2.40	2.80	3.60	5.20	7.70	10.50	15.10	22.50	30.00
2	1.78	2.12	2.56	3.00	3.86	5.58	8.25	11.20	16.00	23.70	31.50
2 1/2	1.86	2.24	2.72	3.20	4.12	5.96	8.80	11.90	16.90	24.90	33.00
3	1.94	2.36	2.88	3.40	4.38	6.34	9.35	12.60	17.80	26.10	34.50
3 1/2	2.02	2.48	3.04	3.60	4.64	6.72	9.90	13.30	18.70	27.30	36.00
4	2.10	2.60	3.20	3.80	4.90	7.10	10.45	14.00	19.60	28.50	37.50
4 1/2	2.18	2.72	3.36	4.00	5.16	7.48	11.00	14.70	20.50	29.70	39.00
5	2.26	2.84	3.52	4.20	5.42	7.86	11.55	15.40	21.40	30.90	40.50
5 1/2	2.34	2.96	3.68	4.40	5.68	8.24	12.10	16.10	22.30	32.10	42.00
6	2.42	3.08	3.84	4.60	5.94	8.62	12.65	16.80	23.20	33.30	43.50
6 1/2	2.50	3.20	4.00	4.80	6.20	9.00	13.20	17.50	24.10	34.50	45.00
7	2.58	3.32	4.16	5.00	6.46	9.38	13.75	18.20	25.00	35.70	46.50
7 1/2	2.66	3.44	4.32	5.20	6.72	9.76	14.30	18.90	25.90	36.90	48.00
8	2.74	3.56	4.48	5.40	6.98	10.14	14.85	19.60	26.80	38.10	49.50
9	2.90	3.80	4.80	5.80	7.50	10.90	15.95	21.00	28.60	40.50	52.50
10	3.06	4.04	5.12	6.20	8.02	11.66	17.05	22.40	30.40	42.90	55.50
11	3.22	4.28	5.44	6.60	8.54	12.42	18.15	23.80	32.20	45.30	58.50
12	3.38	4.52	5.76	7.00	9.06	13.18	19.25	25.20	34.00	47.70	61.50
13	3.54	4.76	6.08	7.40	9.58	13.94	20.35	26.60	35.80	50.10	64.50
14	3.70	5.00	6.40	7.80	10.10	14.70	21.45	28.00	37.60	52.50	67.50
15	3.86	5.24	6.72	8.20	10.62	15.46	22.55	29.40	39.40	54.90	70.50
16	4.02	5.48	7.04	8.60	11.14	16.22	23.65	30.80	41.20	57.30	73.50
17	4.18	5.72	7.36	9.00	11.66	16.98	24.75	32.20	43.00	59.70	76.50
18	4.34	5.96	7.68	9.40	12.18	17.74	25.85	33.60	44.80	62.10	79.50
19	4.50	6.20	8.00	9.80	12.70	18.50	26.95	35.00	46.60	64.50	82.50
20	4.66	6.44	8.32	10.20	13.22	19.26	28.05	36.40	48.40	66.90	85.50
21	.....	.....	.....	.....	.....	.....	29.15	37.80	50.20	69.30	88 50
22	.....	.....	.....	.....	.....	.....	30.25	39.20	52.00	71.70	91.50
23	.....	.....	.....	.....	.....	.....	31.35	40.60	53.80	74.10	94.50
24	.....	.....	.....	.....	.....	.....	32.45	42.00	55.60	76.50	97.50
25	.....	.....	.....	.....	.....	.....	33.55	43.40	57.40	78.90	100.50
26	.....	.....	.....	.....	.....	.....	34.65	44.80	59.20	81.30	103.50
27	.....	.....	.....	.....	.....	.....	35.75	46.20	61.00	83.70	106.50
28	.....	.....	.....	.....	.....	.....	36.85	47.60	62.80	86.10	109.50
29	.....	.....	.....	.....	.....	.....	37.95	49.00	64.60	88.50	112.50
30	.....	.....	.....	.....	.....	.....	39.05	50.40	66.40	90.90	115.50

The following extras are to be understood as a part of this list:

Bolts with hexagon heads or hexagon nuts, 10 per cent extra. If both hexagon heads and hexagon nuts, 20 per cent extra. Joint bolts with oblong nuts, 10 per cent extra. Bolts with tee heads, askew heads and eccentric heads, 20 per cent extra. Key bolts, 20 per cent extra. Bolts with cotter holes, 25 per cent extra.

Machine bolts, when fitted with U. S. standard square nuts, add 5 per cent.

Machine bolts, when fitted with U. S. standard hexagon nuts, add 15 per cent.

MACHINE BOLTS

APPROXIMATE WEIGHT, POUNDS, PER HUNDRED

Length Inches	Diameter, Inches															
	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2
1 1/2	3.1	5.6	8.8	13.5	18.5	25.8	33.4	53.8	88.0	130.0	.....	.....	...	....	....	....
2	3.7	6.5	10.2	15.4	21.0	29.2	37.5	59.7	96.2	140.8	.....	.....	....	....	....	....
2 1/2	4.4	7.5	11.7	17.4	23.6	32.7	41.6	65.7	104.4	151.6	.....	.....	....	....	....	....
3	5.0	8.4	13.1	19.3	26.1	36.1	45.7	71.6	112.6	162.4	210.0	286.0	370	470	....	....
3 1/2	5.7	9.4	14.6	21.3	28.7	39.6	49.8	77.6	120.8	173.2	223.8	302.5	391	495	....	....
4	6.3	10.3	16.0	23.2	31.2	43.0	53.9	83.5	129.0	184.0	237.6	319.1	412	520	750	1070
4 1/2	7.0	11.3	17.5	25.2	33.8	46.5	58.0	89.5	137.2	194.8	251.4	335.6	433	545	784	1114
5	7.6	12.2	18.9	27.1	36.3	49.9	62.1	95.4	145.4	205.6	265.2	352.2	454	570	818	1158
5 1/2	8.3	13.2	20.4	29.1	38.9	53.4	66.2	101.4	153.6	216.4	279.0	368.7	475	595	852	1202
6	8.9	14.1	21.8	31.0	41.4	56.8	70.3	107.3	161.8	227.2	292.8	385.3	496	620	886	1246
6 1/2	9.6	15.1	23.3	33.0	44.0	60.3	74.4	113.3	170.0	238.0	306.6	401.8	517	645	920	1290
7	10.2	16.0	24.7	34.9	46.5	63.7	78.5	119.2	178.2	248.8	320.4	418.4	538	670	954	1334
7 1/2	10.9	17.0	26.2	36.9	49.1	67.2	82.6	125.2	186.4	259.6	334.2	434.9	559	695	988	1378
8	11.5	17.9	27.6	38.8	51.6	70.6	86.7	131.1	194.6	270.4	348.0	451.5	580	720	1022	1422
9	....	....	30.5	42.7	56.7	77.5	94.9	143.0	211.0	292.0	375.6	484.6	622	770	1090	1510
10	....	....	33.4	46.6	61.8	84.4	103.1	154.9	227.4	313.6	403.2	517.7	664	820	1158	1598
11	....	....	36.3	50.5	66.9	91.3	111.3	166.8	243.8	335.2	430.8	550.8	706	870	1226	1686
12	....	....	39.2	54.4	72.0	98.2	119.5	178.7	260.2	356.8	458.4	583.9	748	920	1294	1774
13	....	....	....	....	77.1	105.1	127.7	190.6	276.6	378.4	486.0	617.0	790	970	1362	1862
14	....	....	....	....	82.2	112.0	135.9	202.5	293.0	400.0	513.6	650.1	832	1020	1430	1950
15	....	....	....	....	87.3	118.9	144.1	214.4	309.4	421.6	541.2	683.2	874	1070	1498	2038
16	....	....	....	....	92.4	125.8	152.3	226.3	325.8	443.2	568.8	716.3	916	1120	1566	2126
17	....	....	....	....	97.5	132.7	160.5	238.2	342.2	464.8	596.4	749.4	958	1170	1634	2214
18	....	....	....	....	102.6	139.6	168.7	250.1	358.6	486.4	624.0	782.5	1000	1220	1702	2302
19	....	....	....	....	107.7	146.5	176.9	262.0	375.0	508.0	651.6	815.6	1042	1270	1770	2390
20	....	....	....	....	112.8	153.4	185.1	273.9	391.4	529.6	679.2	848.7	1084	1320	1838	2478
21	....	....	....	....	.....	.....	193.3	285.8	407.8	551.2	706.8	881.8	1126	1370	1906	2566
22	....	....	....	....	.....	.....	201.5	297.7	424.2	572.8	734.4	914.9	1168	1420	1974	2654
23	....	....	....	....	.....	.....	209.7	309.6	440.6	594.4	762.0	948.0	1210	1470	2042	2742
24	....	....	....	....	.....	.....	217.9	321.5	457.0	616.0	789.6	981.1	1252	1520	2110	2830
25	....	....	....	....	.....	.....	226.1	333.4	473.4	637.6	817.2	1014.2	1294	1570	2178	2918
26	....	....	....	....	.....	.....	234.3	345.3	489.8	659.2	844.8	1047.3	1336	1620	2246	3006
27	....	....	....	....	.....	.....	242.5	357.2	506.2	680.8	872.4	1080.4	1378	1670	2314	3094
28	....	....	....	....	.....	.....	250.7	369.1	522.6	702.4	900.0	1113.5	1420	1720	2382	3182
29	....	....	....	....	.....	.....	258.9	381.0	539.0	724.0	927.6	1146.6	1462	1770	2450	3270
30	....	....	....	....	.....	.....	267.1	392.9	555.4	745.6	955.2	1179.7	1504	1820	2518	3358

COMMON CARRIAGE BOLTS

WITH SHORT FULL SQUARE UNDER HEADS, FORGED SQUARE NUTS AND FINISHED POINTS

Fig. 188A

The length of carriage bolts is measured under the head to the point. Larger diameters than those given take machine bolt list.

PRICE, PER HUNDRED

Adopted November 1, 1912

Length Inches	Diameter, Inches						
	3/16 and 1/4	5/16	3/8	7/16	1/2	9/16 and 5/8	3/4
1½	1.00	1.40	1.90	2.20	.....	.....	.....
2	1.10	1.52	2.06	2.40	.....	.....	.....
2½	1.20	1.64	2.22	2.60	3.25	5.75	8.50
3	1.30	1.76	2.38	2.80	3.53	6.13	9.00
3½	1.40	1.88	2.54	3.00	3.81	6.51	9.50
4	1.50	2.00	2.70	3.20	4.09	6.89	10.00
4½	1.60	2.12	2.86	3.40	4.37	7.27	10.50
5	1.70	2.24	3.02	3.60	4.65	7.65	11.00
5½	1.80	2.36	3.18	3.80	4.93	8.03	11.50
6	1.90	2.48	3.34	4.00	5.21	8.41	12.00
6½	2.00	2.60	3.50	4.20	5.49	8.79	12.50
7	2.10	2.72	3.66	4.40	5.77	9.17	13.00
7½	2.20	2.84	3.82	4.60	6.05	9.55	13.50
8	2.30	2.96	3.98	4.80	6.33	9.93	14.00
8½	2.40	3.08	4.14	5.00	6.61	10.31	14.50
9	2.50	3.20	4.30	5.20	6.89	10.69	15.00
9½	2.60	3.32	4.46	5.40	7.17	11.07	15.50
10	2.70	3.44	4.62	5.60	7.45	11.45	16.00
11	2.90	3.68	4.94	6.00	8.01	12.21	17.00
12	3.10	3.92	5.26	6.40	8.57	12.97	18.00
13	3.30	4.16	5.58	6.80	9.13	13.73	19.00
14	3.50	4.40	5.90	7.20	9.69	14.49	20.00
15	3.70	4.64	6.22	7.60	10.25	15.25	21.00
16	3.90	4.88	6.54	8.00	10.81	16.01	22.00
17	4.10	5.12	6.86	8.40	11.37	16.77	23.00
18	4.30	5.36	7.18	8.80	11.93	17.53	24.00
19	4.50	5.60	7.50	9.20	12.49	18.29	25.00
20	4.70	5.84	7.82	9.60	13.05	19.05	26.00

Add 15 per cent extra for hexagon nuts. Intermediate lengths take next higher list Larger diameters than ¾ inch take machine bolt list.

STOVE AND ELEVATOR BUCKET BOLTS

STOVE BOLTS

FLAT HEAD

Fig. 22670A

ROUND HEAD

Fig. 22670B

PRICE, PER HUNDRED

Length Inches	Diameter, Inches 5/32 & 3/16	7/32 & 1/4	5/16	3/8	1/2
3/8	.85	....	....	....	.....
1/2	.85	1.20	....	....	.....
5/8	.85	1.20	....	....	.....
3/4	.85	1.20	1.75	2.65	.....
7/8	.90	1.25	1.80	2.70	.....
1	.90	1.30	1.85	2.75	9.50
1 1/8	.95	1.35	1.90	2.85	9.50
1 1/4	1.00	1.40	1.95	2.90	9.50
1 3/8	1.05	1.45	2.00	3.00	9.50
1 1/2	1.10	1.50	2.05	3.10	9.50
1 3/4	1.15	1.55	2.15	3.20	9.80
2	1.20	1.60	2.30	3.40	10.10
2 1/4	1.25	1.70	2.40	3.60	10.35
2 1/2	1.30	1.80	2.50	3.80	10.65
2 3/4	1.40	1.90	2.60	4.00	10.90

Length Inches	Diameter, Inches 5/32 & 3/16	7/32 & 1/4	5/16	3/8	1/2
3	1.50	2.00	2.70	4.20	11.20
3 1/4	1.60	2.10	2.85	4.40	11.50
3 1/2	1.70	2.20	3.00	4.60	11.75
3 3/4	1.80	2.30	3.15	4.80	12.00
4	1.90	2.40	3.30	5.00	12.30
4 1/4	2.00	2.50	3.45	5.20	12.60
4 1/2	2.10	2.60	3.60	5.40	12.90
4 3/4	2.20	2.70	3.75	5.60	13.15
5	2.30	2.85	3.90	5.80	13.45
5 1/4	2.40	3.00	4.10	6.00	13.75
5 1/2	2.50	3.15	4.30	6.20	14.00
5 3/4	2.60	3.30	4.50	6.40	14.30
6	2.75	3.45	4.70	6.60	14.55
6 1/4	2.90	3.60	4.90	6.80	14.85
6 1/2	3.05	3.75	5.10	7.00	15.10

Nickel-plating, extra per hundred, 1.00.

ELEVATOR BUCKET BOLTS

FLAT HEAD

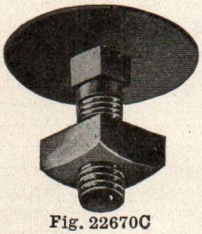


Fig. 22670C

CORRUGATED

Fig. 22670D

BUTTON HEAD

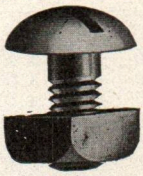


Fig. 22670E

SQUARE HEAD

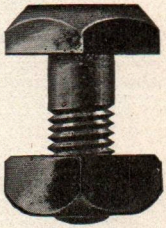


Fig. 22670F

FLAT HEAD

Hand made wrought bolts with extra large thin flat heads.

Size Inches	Price per 100	Size Inches	Price per 100	Size Inches	Price per 100	Size Inches	Price per 100
3/4 x 3/16	2.20	3/4 x 5/16	3.00	1 x 1/4	2.30	1 x 3/8	4.00
1 x 3/16	2.30	1 x 5/16	3.00	1 1/4 x 1/4	2.40	1 1/4 x 3/8	4.30
3/4 x 1/4	2.20	1 1/4 x 5/16	3.20	1 1/2 x 1/4	2.50	1 1/2 x 3/8	4.60
7/8 x 1/4	2.30	1 1/2 x 5/16	3.40	.....	....	.....	....

Above bolts packed 100 in a box.

CORRUGATED

Size.....inches	1/2 x 1/4	5/8 x 1/4	3/4 x 1/4	7/8 x 1/4	1 x 1/4	1 1/4 x 1/4
Price (in Box).....per 100	1.50	1.50	1.50	1.60	2.60	2.80

BUTTON HEAD

Size.....inches	5/8 x 1/4	3/4 x 1/4
Price (in Box).....per 100	2.20	2.20

SQUARE HEAD

Size.....inches	3/4 x 5/16	1 x 5/16	1 x 3/8
Price (in Box).....per 100	2.00	2.00	2.40

STUDS

WITH NUT

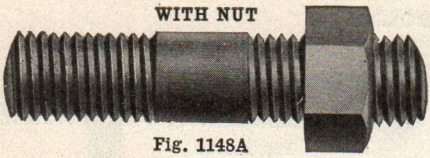


Fig. 1148A

WITHOUT NUT

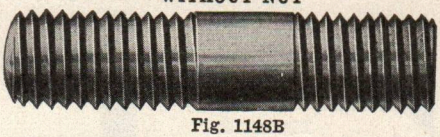


Fig. 1148B

ROUGH, WITH COLD PUNCHED, CHAMFERED AND TRIMMED HEXAGON NUTS—PRICE, PER HUNDRED

Diameter . . inches	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Length, Inches: 1 1/2	4.00	5.10	5.50	.....	.....	.....	.....	.....	.....	.....
1 3/4	4.10	5.25	5.65	.....	.....	.....	.....	.....	.....	.....
2	4.20	5.40	5.80	8.50	8.50	12.40	.....	.....	.....	.....
2 1/4	4.30	5.55	5.95	8.75	8.75	12.70	.....	.....	.....	.....
2 1/2	4.40	5.70	6.10	9.00	9.00	13.00	18.00	.....	.....	.....
2 3/4	4.50	5.85	6.25	9.25	9.25	13.30	18.50	.....	.....	.....
3	4.60	6.00	6.40	9.50	9.50	13.60	19.00	27.80	.....	.....
3 1/4	4.70	6.15	6.55	9.75	9.75	13.90	19.50	28.40	.....	.....
3 1/2	4.80	6.30	6.70	10.00	10.00	14.20	20.00	29.00	.....	.....
3 3/4	4.90	6.45	6.85	10.25	10.25	14.50	20.50	29.60	.....	.....
4	5.00	6.60	7.00	10.50	10.50	14.80	21.00	30.20	45.00	64.00
4 1/2	5.25	6.90	7.30	11.00	11.00	15.40	22.00	31.40	46.50	66.50
5	6.00	7.60	7.60	11.50	11.50	16.00	23.00	32.60	48.00	69.00
5 1/2	7.25	8.00	8.00	12.00	12.00	16.60	24.00	33.80	49.50	71.50
6	8.00	8.45	8.45	12.50	12.50	17.20	25.00	35.00	51.00	74.00
Threads to inch..	16	14	13	12	11	10	9	8	7	7

In ordering, state whole length, and length of thread required on each end.

MILLED OR ROUGH, WITHOUT NUT—PRICE, PER HUNDRED

Diameter . . inches	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Length, Inches: 1 1/4	3.35	4.05	4.40	5.10	.....	.....	.....	.....	.....	.....
1 1/2	3.50	4.20	4.60	5.30	6.10	.....	.....	.....	.....	.....
1 3/4	3.65	4.35	4.80	5.50	6.30	.....	.....	.....	.....	.....
2	3.80	4.50	5.00	5.70	6.50	8.80	.....	.....	.....	.....
2 1/4	3.95	4.65	5.20	5.90	6.70	9.10	.....	.....	.....	.....
2 1/2	4.10	4.80	5.40	6.10	6.90	9.40	12.00	.....	.....	.....
2 3/4	4.25	4.95	5.60	6.30	7.10	9.70	12.50	.....	.....	.....
3	4.40	5.10	5.80	6.50	7.30	10.00	13.00	17.00	21.00	.....
3 1/4	.....	5.25	6.00	6.70	7.50	10.30	13.50	17.75	22.00	.....
3 1/2	.....	5.40	6.20	6.90	7.70	10.60	14.00	18.50	23.00	27.00
3 3/4	.....	5.55	6.40	7.10	7.90	10.90	14.50	19.25	24.00	28.00
4	.....	5.75	6.60	7.30	8.10	11.20	15.00	20.00	25.00	29.00
4 1/4	.....	.....	6.70	7.40	8.25	11.45	15.40	20.50	25.75	29.75
4 1/2	.....	.....	6.80	7.50	8.40	11.65	15.75	21.00	26.50	30.50
4 3/4	.....	.....	7.00	7.60	8.55	11.90	16.15	21.50	27.25	31.25
5	.....	.....	7.20	7.70	8.70	12.10	16.50	22.00	28.00	32.00
5 1/4	.....	.....	.....	7.80	8.85	12.35	16.90	22.50	28.75	32.75
5 1/2	.....	.....	.....	.....	9.00	12.55	17.25	23.00	29.50	33.50
5 3/4	.....	.....	.....	.....	9.15	12.80	17.65	23.50	30.25	34.25
6	.....	.....	.....	.....	9.30	13.00	18.00	24.00	31.00	35.00
Threads to inch..	16	14	12	12	11	10	9	8	7	7
Add for each 1/4 in.	.15	.20	.20	.20	.25	.30	.40	.60	.75	1.00

In ordering, give length of thread wanted on each end. When studs are ordered with nuts, the nuts will be charged separately.

BOILER PATCH AND STEEL BOILER BOLTS

BOILER PATCH BOLTS

FINISHED

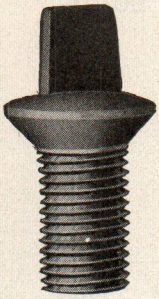


Fig. 5570A

FINISHED

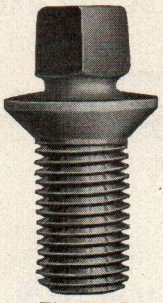


Fig. 5570B

BLANK

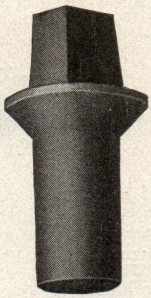


Fig. 5570C

STEEL BOILER BOLT

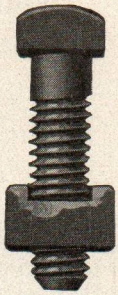


Fig. 5570D

BOILER PATCH BOLTS—PRICE, PER HUNDRED

Length from Largest Diam. of Bevel to Point Inches	Diameter, Inches						
	½	⅝	¾	⅞	1	1⅛	1¼
¾	3.75	4.25	....	....	....	....	....
⅞	4.00	4.50	6.00	....	....	....	....
1	4.25	4.80	6.50	9.50	13.50	18.50	....
1⅛	4.50	5.10	6.80	9.85	14.00	19.25	25.50
1¼	4.75	5.50	7.25	10.25	14.75	20.25	27.00
1½	5.25	6.50	8.25	11.25	16.25	22.50	30.50
2	....	....	....	....	....	27.50	35.00
2½	....	....	....	....	....	33.50	42.00

Heads of patch bolts are countersunk at an angle of 45 degrees.

Length of patch bolts is measured from widest part of countersink to end.

Unless otherwise ordered, patch bolts will be furnished with 12 "V" threads to the inch, steam-tight. When ordering, always specify whether necked or not.

Prices of blank patch bolts quoted on application.

STEEL BOILER BOLTS—PRICE, PER HUNDRED

WITH CONE POINTS AND PATENT RECESSED SQUARE NUTS

Adopted March 19, 1907

Length under Head Inches	Diameter, Inches			
	½	⅝	¾	⅞
1½	6.00	9.00	12.70	18.80
2	6.35	9.55	13.45	19.80
2½	6.70	10.10	14.20	20.80
3	7.05	10.65	14.95	21.80
3½	7.40	11.20	15.70	22.80
4	7.75	11.75	16.45	23.80
4½	8.10	12.30	17.20	24.80
5	8.45	12.85	17.95	25.80

These bolts are made of soft steel with coarse threads, so that the nuts can be run on or off quickly by hand, and will be found of great convenience to boiler makers, being much better adapted for "fitting up bolts" than the ordinary machine bolts. Fitted with plain or recessed nuts.

STAR EXPANSION SHIELDS AND DRILLS

DOUBLE EXPANSION SHIELDS FOR MACHINE BOLTS

Fig. 13273A

Diameter of Bolt .....inches	1/4	5/16	3/8	7/16	1/2	5/8
Length of Shield..... "	1 1/2	1 7/8	2 3/8	2 1/2	2 5/8	3 1/4
Diameter of Drill Required "	9/16	5/8	3/4	1	1	1 1/8
Price, Shield only....per hundred	9.00	11.00	13.00	16.00	18.00	24.00
Diameter of Bolt .....inches	3/4	7/8	1	1 1/8	1 1/4	1 1/2
Length of Shield..... "	4	4 3/4	5	6 1/4	6 1/4	7 1/2
Diameter of Drill Required "	1 3/8	1 5/8	1 3/4	2 1/8	2 1/8	2 1/2
Price, Shield only....per hundred	36.00	60.00	65.00	140.00	150.00	220.00

SEBCO FOUR POINT DRILL FOR BRICK AND STONE

Fig. 13273B

SEBCO EXTENSION DRILL HEAD FOR BRICK AND SOFT STONE

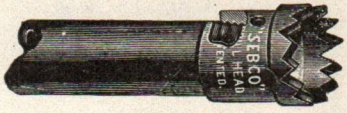


Fig. 13273C

SEBCO FOUR POINT DRILLS

	Prices, per Dozen									
Diam. of Drill, inches	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1 1/8
Length 8 "	8.25	8.25	8.25	8.70	9.65	11.65	13.70	15.30	17.00	....
" 12 "	8.50	8.50	8.50	9.00	10.00	12.00	14.00	16.00	18.00	24.00
" 18 "	11.00	11.00	11.00	11.50	12.50	15.00	17.50	20.00	22.50	28.00
" 24 "	13.50	13.50	13.50	14.00	15.00	17.50	20.00	22.50	25.00	32.00
Diam. of Drill, inches	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2	....
Length 12 "	30.00	40.00	50.00	60.00	75.00	90.00	105.00	135.00	165.00	....
" 18 "	35.00	45.00	56.00	66.00	81.00	97.00	112.00	145.00	175.00	....
" 24 "	40.00	50.00	62.00	72.00	87.00	104.00	120.00	165.00	195.00	....

SEBCO EXTENSION DRILL HEADS

Number.....	2	3	4	5	5A	6	6A	7	7A
Diam. of Cutting Edge..in.	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4
Threaded for Iron Pipe.. "	1/8	1/4	3/8	1/2	1/2	3/4	3/4	3/4	1
Price..... per dozen	3.00	3.00	3.00	3.00	3.60	4.20	7.50	9.00	10.50
Number.....	8	9	9A	10	10A	11	11A	11B	12
Diam. of Cutting Edge..in.	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4
Threaded for Iron Pipe.. "	1	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4
Price..... per dozen	12.00	18.00	22.00	27.00	31.00	36.00	40.00	44.00	48.00

CINCH ANCHORING SYSTEM

TWO-UNIT ANCHORAGE

Without Bolts, Consisting of Four Pieces: Two Irons, Two Leads

PLAIN ANCHORAGE FOR CINCH ANCHORS

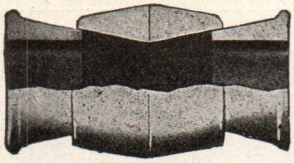


Fig. 8323A

CINCH EXPANSION BOLT BEFORE EXPANSION STANDARD MACHINE BOLT

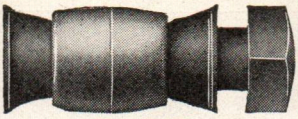


Fig. 8323B

THREADED ANCHORAGE FOR CINCH ANCHOR

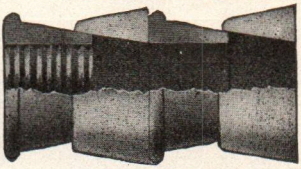


Fig. 8323C

CINCH ANCHOR BEFORE EXPANSION WITH MACHINE BOLT AND NUT

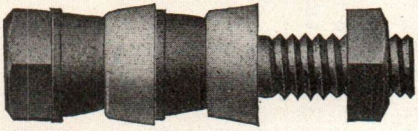


Fig. 8323D

CINCH STUD ANCHOR BEFORE EXPANSION WITH STUD BOLT AND NUT

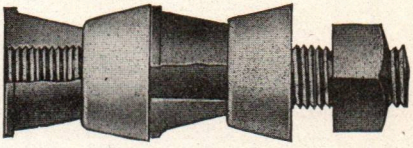


Fig. 8323E

Units plain or threaded. Use two units for anchorage of ordinary strength.

Diameter of Bolts..inches	3/16	1/4	5/16	3/8	7/16	1/2	5/8
Minimum Depth of Holes... "	7/8	1 1/16	1 1/16	1 1/2	1 1/2	1 3/4	1 7/8
Diameter of *Holes..... "	1/2	5/8	5/8	13/16	13/16	1	1 1/8
Price .....*per 100 sets	**7.00**	**8.00**	**9.00**	**11.00**	**15.00**	**18.00**	**24.00**
Diameter of Bolts..inches	3/4	7/8	1	1 1/8	1 1/4	1 1/2	....
Minimum Depth of Holes.. "	2 1/2	2 3/4	3 1/4	4 1/2	4 3/4	5 1/4	....
Diameter of *Holes..... "	1 3/8	1 1/2	1 5/8	2	2 1/8	2 3/8	....
Price .....*per 100 sets	**35.00**	**44.00**	**63.00**	**140.00**	**150.00**	**220.00**	....

*Two irons, two leads.

THREE-UNIT ANCHORAGE

Without Bolts, Consisting of Six Pieces: Three Irons, Three Leads

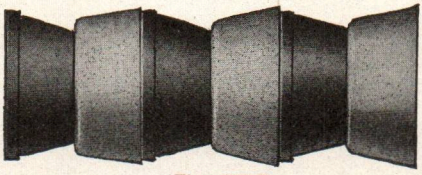


Fig. 8323F

Consists of two units plain and one threaded or the three units plain. Use three units when an anchorage stronger than the bolt is wanted.

Diameter of Bolts..inches	3/16	1/4	5/16	3/8	7/16	1/2	5/8
Minimum Depth of Holes.. "	1 1/8	1 5/8	1 5/8	2 1/4	2 1/4	2 5/8	2 7/8
Diameter of *Holes..... "	1/2	5/8	5/8	13/16	13/16	1	1 1/8
Price .....per 100	**10.50**	**12.00**	**13.50**	**16.50**	**22.50**	**27.00**	**36.00**
Diameter of Bolts..inches	3/4	7/8	1	1 1/8	1 1/4	1 1/2	....
Minimum Depth of Holes.. "	3 3/4	4	4 7/8	6	6 1/4	7 1/4	....
Diameter of *Holes..... "	1 3/8	1 1/2	1 5/8	2	2 1/8	2 3/8	....
Price .....per 100	**52.50**	**66.00**	**94.50**	**210.00**	**225.00**	**330.00**	....

*Size of drill required.

Prices of Cinch Calking Tools and Drills upon application.

IRON AND STEEL

WEIGHTS OF ROUND AND SQUARE IRON AND STEEL PER LINEAL FOOT, IN POUNDS

Size Inches	Round		Square		Size Inches	Round		Square	
	Iron	Steel	Iron	Steel		Iron	Steel	Iron	Steel
1/4	.164	.170	.208	.210	2 1/2	16.36	16.68	20.83	21.20
5/16	.256	.260	.326	.330	2 5/8	18.04	18.39	22.97	23.50
3/8	.368	.380	.469	.480	2 3/4	19.80	20.18	25.21	25.70
7/16	.501	.510	.638	.650	2 7/8	21.64	22.06	27.55	28.20
1/2	.654	.670	.833	.850	3	23.56	24.10	30.00	30.60
9/16	.828	.850	1.055	1.080	3 1/8	25.57	26.12	32.55	33.13
5/8	1.023	1.040	1.302	1.330	3 1/4	27.65	28.30	35.21	35.96
11/16	1.237	1.270	1.576	1.610	3 3/8	29.82	30.45	37.97	38.64
3/4	1.473	1.500	1.875	1.920	3 1/2	32.07	32.70	40.83	41.60
13/16	1.728	1.760	2.201	2.240	3 5/8	34.40	35.20	43.80	44.57
7/8	2.004	2.040	2.552	2.600	3 3/4	36.82	37.54	46.88	47.80
15/16	2.301	2.350	2.930	3.060	4	41.89	42.72	53.33	54.40
1	2.618	2.650	3.333	3.400	4 1/4	47.29	48.30	60.21	61.40
1 1/8	3.313	3.380	4.219	4.300	4 1/2	53.01	54.60	67.50	68.90
1 1/4	4.091	4.170	5.208	5.310	4 3/4	59.07	60.30	75.21	76.70
1 3/8	4.950	5.050	6.302	6.430	5	65.45	66.80	83.33	85.00
1 1/2	5.890	6.010	7.500	7.650	5 1/4	72.16	73.60	91.88	93.70
1 5/8	6.913	7.050	8.802	8.980	5 1/2	79.19	80.80	100.80	102.80
1 3/4	8.018	8.180	10.210	10.400	5 3/4	86.56	88.30	110.20	112.40
1 7/8	9.204	9.380	11.720	11.900	6	94.25	96.10	120.00	122.40
2	10.470	10.710	13.330	13.600	6 1/4	102.30	104.30	130.20	132.80
2 1/8	11.820	12.050	15.050	15.400	6 1/2	110.60	112.80	140.80	143.60
2 1/4	13.250	13.600	16.880	17.200	7	128.30	130.90	163.30	166.60
2 3/8	14.770	15.100	18.800	19.200	...	.....	.....	.....	.....

WEIGHTS OF FLAT IRON, PER LINEAL FOOT, IN POUNDS

Width Inches	Thickness, Inches											
	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
1	.42	.63	.83	1.04	1.25	1.67	2.08	2.50	3.33	4.17	5.00	6.67
1 1/8	.47	.70	.94	1.17	1.41	1.87	2.34	2.81	3.75	4.69	5.63	7.50
1 1/4	.52	.78	1.04	1.30	1.56	2.08	2.60	3.13	4.17	5.21	6.25	8.33
1 3/8	.57	.86	1.15	1.43	1.72	2.29	2.86	3.44	4.58	5.73	6.88	9.17
1 1/2	.63	.94	1.25	1.56	1.88	2.50	3.13	3.75	5.00	6.25	7.50	10.00
1 5/8	.68	1.02	1.36	1.69	2.03	2.71	3.30	4.06	5.42	6.77	8.13	10.83
1 3/4	.73	1.09	1.46	1.82	2.19	2.92	3.65	4.38	5.83	7.29	8.75	11.67
2	.83	1.25	1.67	2.08	2.50	3.33	4.17	5.00	6.67	8.33	10.00	13.33
2 1/4	.94	1.41	1.88	2.34	2.81	3.75	4.65	5.63	7.50	9.38	11.25	15.00
2 1/2	1.04	1.56	2.08	2.60	3.13	4.17	5.21	6.25	8.33	10.42	12.50	16.67
2 3/4	1.15	1.72	2.29	2.86	3.44	4.58	5.73	6.88	9.17	11.46	13.75	18.33
3	1.25	1.88	2.50	3.13	3.75	5.00	6.25	7.50	10.00	12.50	15.00	20.00
3 1/4	1.35	2.03	2.71	3.39	4.06	5.42	6.77	8.13	10.83	13.54	16.25	21.67
3 1/2	1.46	2.19	2.92	3.65	4.38	5.83	7.29	8.75	11.67	14.58	17.50	23.33
3 3/4	1.56	2.34	3.13	3.91	4.69	6.25	7.81	9.38	12.50	15.63	18.75	25.00
4	1.67	2.50	3.33	4.17	5.00	6.67	8.33	10.00	13.33	16.67	20.00	26.67
4 1/2	1.88	2.81	3.75	4.69	5.63	7.50	9.38	11.25	15.00	18.75	22.50	30.00
5	2.08	3.13	4.17	5.21	6.25	8.33	10.42	12.50	16.07	20.83	25.00	33.33
5 1/2	2.29	3.44	4.58	5.73	6.88	9.17	11.46	13.75	18.33	22.92	27.50	36.67
6	2.50	3.75	5.00	6.25	7.50	10.00	12.50	15.00	20.00	25.00	30.00	40.00
7	2.92	4.38	5.83	7.29	8.75	11.67	14.58	17.50	23.33	29.17	35.00	46.67
8	3.33	5.00	6.67	8.33	10.00	13.33	16.67	20.00	26.67	33.33	40.00	53.33

STANDARD STEEL CLASSIFICATION

REVISED JAN. 1, 1919
ADOPTED MAY 22, 1918
EXTRAS PER 100 POUNDS

ROUNDS AND SQUARES

3/4 to 3 1/16 in.	Base	9/32 in.	.80	4 1/8 to 4 9/16 in.	.30
5/8 " 11/16 "	.10	1/4 "	1.00	4 5/8 " 5 1/16 "	.40
1/8 " 9/16 "	.20	15/64 "	1.50	5 1/8 " 5 9/16 "	.50
1/2 in.	.40	7/32 "	2.00	5 5/8 " 6 1/16 "	.75
7/16 "	.50	3/16 "	2.50	6 1/8 " 6 9/16 "	1.00
3/8 "	.60	3 1/8 to 3 9/16 in.	.15	6 5/8 " 7 1/4 "	1.25
11/32 "	.70	3 5/8 " 4 1/16 "	.25		
5/16 "					

OVALS

3/4 to 2 1/2 in. x 3/8 in. and thicker	.40	1/2 to 9/16 in. x 1/4 in. and thicker	1.10
3/4 " 2 1/2 " x 1/4 " to 5/16 in.	.60	1/2 " 9/16 " x 1/8 " to 3/16 in.	1.40
3/4 " 2 1/2 " x 3/32 " " 3/16 "	.90	1/2 " 9/16 " x 3/32 "	1.90
5/8 " 11/16 " x 3/32 " and thicker	.70	3/8 " 7/16 " x 3/16 " and thicker	1.90
5/8 " 11/16 " x 3/16 " to 1/4 in.	1.00	3/8 " 7/16 " x 1/8 " to 3/32 in.	2.40
5/8 " 11/16 " x 1/8 " " 5/32 "	1.30	3/8 " 7/16 " x 3/32 "	2.90

HALF OVALS

1 to 4 in. x 1/4 in. and thicker	.50	5/8 to 11/16 in. x Nos. 10, 11, 12 and 1/8 in.	1.50
1 " 4 " x Nos. 7, 8, 9 and 3/16 in.	.70	5/8 " 11/16 " x " 13, 14 and 15	1.80
1 " 4 " x " 10, 11, 12 and 1/8 in.	1.00	1/2 " 9/16 " x 1/8 in. and thicker	1.60
3/4 " 15/16 " x 3/16 in. and thicker	1.00	1/2 " 9/16 " x Nos. 13, 14 and 15	2.10
3/4 " 15/16 " x Nos. 10, 11, 12 and 1/8 in.	1.30	3/8 " 7/16 " x 3/32 in. and thicker	2.70
3/4 " 15/16 " x " 13, 14 and 15	1.60	3/8 " 7/16 " x Nos. 14 and 15	3.20
5/8 " 11/16 " x 5/32 in. and thicker	1.20		

HALF ROUNDS

1 to 3 in.	.40	5/8 to 11/16 in.	1.00	3/8 to 7/16 in.	2.20
3/4 " 13/16 "	.70	1/2 " 9/16 "	1.40		

HEXAGONS

3/4 to 3 in.	.30	7/16 in.	1.10	1/4 in.	2.00
5/8 " 11/16 "	.50	3/8 "	1.30		
1/2 " 9/16 "	.70	5/16 "	1.50		

BANDS

1 7/16 to 6 in. x Nos. 7, 8, 9 and 3/16 in.	Base	11/16 to 3/4 in. x Nos. 7, 8, 9 and 3/16 in.	.60
1 " 1 3/8 " x " 7, 8, 9 " 3/16 "	.10	3/4 in. x Nos. 10, 11, 12 and 1/8 in.	.70
1 7/16 " 4 " x " 10, 11, 12 " 1/8 "	.10	11/16 " x " 10, 11, 12 " 1/8 "	.80
4 1/16 " 6 " x " 10, 11, 12 " 1/8 "	.20	9/16 to 5/8 in. x Nos. 7, 8, 9 and 3/16 in.	.80
1 7/16 " 1 3/8 " x " 10, 11, 12 " 1/8 "	.20	9/16 " 5/8 " x " 10, 11, 12 " 1/8 "	.90
15/16 in. x Nos. 7, 8, 9 and 3/16 in.	.20	1/2 in. x Nos. 7, 8, 9 and 3/16 in.	.90
15/16 to 1 in. x Nos. 10, 11, 12 and 1/8 in.	.30	1/2 " x " 10, 11, 12 " 1/8 "	1.10
7/8 in. x Nos. 7, 8, 9 and 3/16 in.	.30	7/16 " x " 7, 8, 9 " 3/16 "	1.40
7/8 " x " 10, 11, 12 " 1/8 "	.50	7/16 " x " 10, 11, 12 " 1/8 "	1.70
13/16 " x " 7, 8, 9 " 3/16 "	.40	3/8 " x " 7, 8, 9 " 3/16 "	1.50
13/16 " x " 10, 11, 12 " 1/8 "	.60	3/8 " x " 10, 11, 12 " 1/8 "	2.00

FLATS

1 to 6 in. x 3/8 to 1 in.	Base	7/16 in. x 3/8 in.	1.40
1 " 6 " x 1/4 " 5/16 "	.20	7/16 " x 1/4 to 5/16 "	1.60
11/16 " 15/16 " x 3/8 " 3/4 "	.40	3/8 " x 1/4 " 5/16 "	2.00
11/16 " 15/16 " x 1/4 " 5/16 "	.50	1 1/8 to 6 " x 1 1/16 " 1 3/16 "	.10
9/16 " 5/8 " x 3/8 " 1 "	.50	1 1/8 " 6 " x 1 1/4 " 1 1/2 "	.20
9/16 " 5/8 " x 1/4 " 5/16 "	.70	1 3/4 " 6 " x 1 5/8 " 2 3/4 "	.30
1/2 " x 3/8 " 7/16 "	1.00	3 1/2 " 6 " x 3 " 4 "	.40
1/2 " x 1/4 " 5/16 "	1.20		

QUANTITY DIFFERENTIALS

All specifications for less than 2000 lbs. of a size will be subject to the following extras, the total weight of a size ordered to determine the extra, regardless of length and regardless of exact quantity actually shipped.

Quantities Less Than 2000 lbs. but Not Less Than 1000 lbs.	.30
Quantities Less Than 1000 Lbs.	.70

STANDARD STEEL CLASSIFICATION

EXTRAS PER 100 POUNDS

SPRING STEEL—ROUND AND SQUARE

5/8 to 1 1/2 Inches	Base	5/16 Inch	1.00
1/2 " 9/16 Inch	.20	1/4 and 9/32 Inch	1.50
3/8 " 7/16 "	.50		

SPRING STEEL—FLAT

1 1/4 to 6 Inches x No. 4 to 1/2 Inch	Base
1 and 1 1/8 Inches x No. 1 to No. 4	.20
1 to 3 " x " 5 " " 7	.50
3/4 and 15/16 Inch x " 1 " " 7	.50
3/8 to 11/16 " x " 1 " " 7	1.00
3/4 " 3 Inches x " 8 " " 10	1.00
3/4 " 3 " x " 11 " " 16	1.50
3/4 " 3 " x " 17 " " 20	2.20
3/8 " 5/8 Inch x " 10 " " 16	4.00
3/8 " 5/8 " x " 17 " " 20	5.00
3/8 " 5/8 " x " 21 " " 24	6.00

On intermediate sizes, the extra for next lighter size will apply.

EXTRAS FOR CUTTING

No charge for shearing to specified lengths 5 feet or over.
Shearing to specified lengths over 2 to 5 feet, 20 cents per 100 pounds.
Shearing to specified lengths 2 feet and under, subject to special arrangement.

STEEL TIRES

1 x 1/4 Inch and heavier	Base	7/8 x 1/8 and 5/32 Inch	.60
1 1/2 x 13/16 and 7/32 Inch	.20	3/4 x 1/4 Inch	.30
1 to 1 7/16 x 3/16 and 7/32 Inch	.30	3/4 x 3/16 and 7/32 Inch	.80
1 " 1 7/16 x 1/8 Inch	.50	3/4 x 1/8 " 5/32 "	1.00
3/8 x 1/4 and 5/16 Inch	.30	5/8 x 3/16 Inch	1.00
7/8 x 3/16 " 7/32 "	.50	5/8 x 1/8 and 5/32 Inch	1.10

For intermediate sizes, the next higher extra to be charged in all cases.

TOE CALK STEEL

Width Inches	Thickness, Inches 3/16	1/4	5/16	3/8 or Over
1/4	2.00	2.00	....	....
5/16	2.00	1.50	1.00	....
3/8	2.00	1.50	.75	.75
7/16	2.00	.75	.75	.75
1/2	2.00	.75	.50	Base
5/8 to 1	1.00	.75	.50	"

For intermediate sizes, the next higher extra to be charged in all cases.

QUANTITY DIFFERENTIALS

All specifications for less than 2000 pounds of a size will be subject to the following extras, the total weight for a size ordered to determine the extra, regardless of length and regardless of exact quantity actually shipped.

Quantities Less than 2000 Pounds but Less than 1000 Pounds	.30
" " " 1000 "	.70

HORSESHOE AND PLOW STEEL

Special prices upon application.

COLD-ROLLED STEEL

HEXAGON
SPECIAL STEEL FOR SCREWS

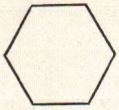


Fig. 11155A

SQUARE
FOR KEYS, SPLINES AND SQUARE SHAFTS

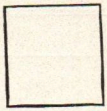


Fig. 11155B

Extras over base per 100 pounds net.

Size Inches	Price per 100 Pounds	Size Inches	Price per 100 Pounds	Size Inches	Price per 100 Pounds
1/8 to 5/32	3.50	1/2 to 5/8	1.00	2 1/16 to 2 7/16	1.00
3/16 " 7/32	3.00	11/16 " 13/16	.80	2 1/2 " 3	1.50
1/4 " 5/16	2.00	7/8 " 1 5/16	.70	3 1/16 " 4	2.00
3/8 " 7/16	1.35	1 3/8 " 2	.60	.....	....

FLATS

FOR KEYS, ENGINES, ETC.

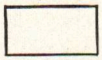


Fig. 11155C

Extras over base per 100 pounds net.

Thickness Inches	Price, per 100 Pounds—Width, Inches: 1/4	5/16 to 1/2	9/16 to 23/32	3/4 to 1	1 1/16 to 1 1/2	1 9/16 to 3	Wider than 3
1/8 and 5/32	8.50	6.50	5.50	4.50	3.50	2.50	2.50
3/16 to 5/16	7.50	5.50	5.00	3.50	2.50	1.50	2.50
3/8 " 7/16	....	4.50	4.00	2.50	2.50	1.50	2.50
1/2 " 9/16	....	....	3.00	1.50	1.50	1.25	2.50
5/8 " 11/16	....	....	2.50	1.25	1.25	1.25	2.50
3/4 " 15/16	....	....	....	1.25	1.25	1.25	2.50
1 " 1 7/16	....	....	....	....	1.25	1.25	2.50
1 1/2 " 1 11/16	....	....	....	....	....	1.25	2.50
1 3/4 " 1 15/16	....	....	....	....	....	1.25	2.50
2 " 2 15/16	....	....	....	....	....	1.25	2.50

EXTRAS FOR LONG AND SHORT LENGTHS

Length	Price, per 100 Lbs. Squares	Flats
3 In. to 5 15/16 In.	1.50	3.00
6 " " 11 15/16 "	.75	1.50
12 " " 23 15/16 "	.60	.75
24 " " 59 15/16 "	.30	.40
Lengths Longer than 24 Ft. and Less than 30 Ft.	.50	.50
30 Ft. and Less " 35 "	1.00	1.00
35 " " " " 40 "	1.50	1.50
40 " " " " 45 "	2.00	2.00
45 " " " Longer	2.50	2.50

BOXING AND BURLAPPING

Boxing (Minimum 50 Cents), Domestic Shipment	per 100 pounds net	.40
" " 50 " Export "	" 100 " "	.50
Burlapping (Minimum 25 Cents), Full Length	" 100 " "	.25
" " 25 " Ends only	" 100 " "	.10

WEIGHT OF FLAT ROLLED STEEL BARS

PER LINEAL FOOT

Width Inches	Thickness, Inches									
	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
1/2	.1060	.2125	.319	.425	.531	.638	.744	.850	1.06	1.28
5/8	.1381	.2656	.399	.531	.664	.797	.929	1.06	1.33	1.60
3/4	.1594	.3188	.478	.636	.797	.957	1.116	1.275	1.594	1.913
7/8	.1859	.3720	.558	.743	.929	1.116	1.302	1.487	1.859	2.232
1	.212	.425	.638	.850	1.06	1.28	1.49	1.70	2.12	2.55
1 1/8	.2391	.4782	.717	.959	1.20	1.43	1.68	1.92	2.39	2.87
1 1/4	.2656	.5312	.797	1.06	1.33	1.59	1.86	2.12	2.65	3.19
1 3/8	.292	.585	.875	1.17	1.46	1.76	2.05	2.34	2.92	3.51
1 1/2	.319	.638	.957	1.28	1.59	1.92	2.23	2.55	3.19	3.83
1 5/8	.346	.692	1.04	1.38	1.73	2.08	2.42	2.77	3.46	4.15
1 3/4	.372	.744	1.11	1.49	1.86	2.23	2.60	2.98	3.72	4.47
2	.425	.850	1.28	1.70	2.12	2.55	2.98	3.40	4.25	5.10
2 1/4	.478	.96	1.44	1.91	2.39	2.87	3.35	3.83	4.78	5.75
2 1/2	.531	1.06	1.59	2.12	2.65	3.19	3.72	4.25	5.31	6.38
2 3/4	.585	1.17	1.75	2.34	2.92	3.51	4.09	4.67	5.84	7.02
3	.638	1.28	1.91	2.55	3.19	3.83	4.46	5.10	6.38	7.65
3 1/4	.691	1.38	2.07	2.76	3.45	4.15	4.83	5.53	6.91	8.29
3 1/2	.745	1.49	2.23	2.98	3.72	4.47	5.20	5.95	7.44	8.93
3 3/4	.80	1.59	2.39	3.19	3.99	4.78	5.58	6.38	7.97	9.57
4	.85	1.70	2.55	3.40	4.25	5.10	5.95	6.80	8.50	10.20
4 1/4	.90	1.81	2.71	3.61	4.52	5.42	6.32	7.22	9.03	10.84
4 1/2	.96	1.91	2.87	3.83	4.78	5.74	6.70	7.65	9.57	11.48
4 3/4	1.01	2.02	3.03	4.04	5.05	6.06	7.07	8.08	10.10	12.12
5	1.06	2.13	3.19	4.25	5.31	6.38	7.44	8.50	10.63	12.75
5 1/4	1.116	2.232	3.35	4.46	5.58	6.69	7.81	8.93	11.16	13.39
5 1/2	1.169	2.338	3.51	4.67	5.84	7.02	8.18	9.35	11.69	14.03
5 3/4	1.222	2.444	3.67	4.89	6.11	7.34	8.56	9.77	12.22	14.67
6	1.275	2.550	3.83	5.10	6.38	7.65	8.93	10.20	12.75	15.30
6 1/4	1.328	2.656	3.99	5.31	6.64	7.97	9.29	10.63	13.28	15.94
6 1/2	1.382	2.765	4.14	5.53	6.90	8.29	9.67	11.05	13.81	16.58
6 3/4	1.434	2.869	4.30	5.74	7.17	8.61	10.04	11.48	14.34	17.22
7	1.487	2.975	4.46	5.95	7.44	8.93	10.41	11.90	14.87	17.85
7 1/2	1.594	3.188	4.78	6.36	7.97	9.57	11.16	12.75	15.94	19.13
8	1.70	3.40	5.10	6.80	8.50	10.20	11.90	13.60	17.00	20.40
8 1/2	1.806	3.612	5.42	7.22	9.03	10.84	12.64	14.44	18.06	21.68
9	1.913	3.826	5.74	7.65	9.56	11.48	13.40	15.30	19.13	22.96
9 1/2	2.019	4.037	6.06	8.08	10.10	12.12	14.14	16.16	20.19	24.23
10	2.125	4.25	6.38	8.5	10.62	12.75	14.88	17.00	21.25	25.50
11	2.335	4.676	7.02	9.34	11.68	14.03	16.36	18.70	23.38	28.05
12	2.55	5.10	7.65	10.20	12.75	15.30	17.85	20.40	25.50	30.60

WEIGHT OF FLAT ROLLED STEEL BARS

PER LINEAL FOOT

Width, Inches	THICKNESS, INCHES									
	⅞	1	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	2
1	2.98	3.4	3.83	4.25	4.67	5.1	5.52	5.95	6.38	6.80
1⅛	3.35	3.83	4.3	4.79	5.26	5.74	6.22	6.7	7.17	7.65
1¼	3.72	4.25	4.78	5.31	5.84	6.38	6.90	7.44	7.97	8.50
1⅜	4.09	4.69	5.26	5.85	6.43	7.02	7.60	8.19	8.77	9.33
1½	4.47	5.10	5.74	6.38	7.02	7.65	8.29	8.93	9.57	10.20
1⅝	4.84	5.53	6.22	6.91	7.60	8.29	8.98	9.67	10.36	11.05
1¾	5.20	5.95	6.70	7.44	8.18	8.93	9.67	10.42	11.15	11.90
2	5.95	6.80	7.65	8.50	9.35	10.20	11.05	11.90	12.75	13.60
2¼	6.69	7.65	8.61	9.57	10.52	11.48	12.43	13.40	14.34	15.30
2½	7.44	8.50	9.57	10.63	11.69	12.75	13.81	14.88	15.94	17.00
2¾	8.18	9.35	10.52	11.69	12.85	14.03	15.19	16.37	17.53	18.70
3	8.93	10.20	11.48	12.75	14.03	15.30	16.58	17.85	19.13	20.40
3¼	9.67	11.05	12.43	13.81	15.20	16.58	17.96	19.34	20.72	22.10
3½	10.41	11.90	13.39	14.87	16.36	17.85	19.34	20.83	22.31	23.80
3¾	11.16	12.75	14.34	15.94	17.53	19.13	20.72	22.32	23.91	25.50
4	11.90	13.60	15.30	17.00	18.70	20.40	22.10	23.80	25.50	27.20
4¼	12.65	14.45	16.26	18.06	19.87	21.68	23.48	25.29	27.10	28.90
4½	13.39	15.30	17.22	19.13	21.04	22.95	24.87	26.78	28.69	30.60
4¾	14.13	16.15	18.17	20.19	22.21	24.23	26.25	28.27	30.28	32.30
5	14.87	17.00	19.13	21.25	23.38	25.50	27.63	29.75	31.87	34.00
5¼	15.62	17.85	20.08	22.32	24.54	26.78	29.01	31.24	33.47	35.70
5½	16.36	18.70	21.04	23.38	25.71	28.05	30.39	32.73	35.06	37.40
5¾	17.10	19.55	21.99	24.44	26.88	29.33	31.77	34.22	36.65	39.10
6	17.85	20.40	22.95	25.50	28.05	30.60	33.15	35.70	38.25	40.80
6¼	18.60	21.25	23.91	26.56	29.22	31.88	34.53	37.19	39.85	42.50
6½	19.34	22.10	24.87	27.62	30.39	33.15	35.91	38.68	41.44	44.20
6¾	20.08	22.95	25.82	28.69	31.56	34.43	37.99	40.17	43.03	45.90
7	20.83	23.80	26.78	29.75	32.72	35.70	38.67	41.65	44.63	47.60
7½	22.32	25.50	28.68	31.88	35.06	38.26	41.44	44.63	47.82	51.00
8	23.80	27.20	30.60	34.00	37.40	40.80	44.20	47.60	51.00	54.40
8½	25.30	28.90	32.52	36.12	39.74	43.35	46.96	50.58	54.20	57.80
9	26.78	30.60	34.43	38.26	42.08	45.90	49.73	53.56	57.38	61.20
9½	28.26	32.20	36.34	40.37	44.41	48.45	52.49	56.53	60.56	64.60
10	29.75	34.00	38.25	42.50	46.75	51.00	55.25	59.59	63.75	68.00
11	32.72	37.40	42.08	46.76	51.42	56.10	60.78	65.45	70.12	74.80
12	35.70	40.80	45.90	51.00	56.10	61.20	66.30	71.40	76.50	81.60

TOOL STEEL CLASSIFICATION

EXTRAS PER POUND

CARBON STEEL

ROUNDS, SQUARES AND OCTAGONS

5/8 to 2 Inches	Base	6 1/8 to 7 Inches	.06	1/4 and 9/32 Inch	.06
2 1/8 " 3 "	.02	7 1/8 " 8 "	.07	3/16 Inch	.10
3 1/8 " 4 "	.03	9/16 " 1/2 "	.01	5/32 "	.20
4 1/8 " 5 "	.04	7/16 " 3/8 "	.02	1/8 "	.36
5 1/8 " 6 "	.05	5/16 and 11/32 "	.04		

FLATS

5/8 to 2 Inches Thick x 9/16 to 2 Inches Wide ..... Base

1/8 x 3/16 Inch	.40	3/16 x 7 1/8 to 8 Inches	.04	5/8 to 2 x 2 1/8 to 7 In.	.02
1/8 x 1/4 "	.30	1/4 x 5/16 " 3/8 "	.04	5/8 " 1 3/4 x 7 1/8 " 8 "	.02
1/8 x 5/16 "	.16	1/4 x 7/16 " 5/8 "	.03	1 7/8 " 2 x 7 1/8 " 8 "	.03
1/8 x 3/8 "	.08	1/4 x 11/16 " 2 "	.03	2 1/8 " 3 x 2 1/8 " 5 "	.02
1/8 x 7/16 to 1/2 Inch	.06	1/4 x 2 1/8 " 7 "	.02	2 1/8 " 3 x 5 1/8 " 8 "	.03
1/8 x 9/16 " 7 Inches	.04	1/4 x 7 1/8 " 8 "	.04	3 1/8 " 4 x 3 1/8 " 6 "	.03
1/8 x 7 1/8 " 8 "	.06	5/16 x 3/8 " 5/8 "	.03	3 1/8 " 4 x 6 1/8 " 8 "	.04
3/16 x 1/4 Inch	.10	5/16 x 11/16 " 8 "	.02	4 1/8 " 5 x 4 1/8 " 7 "	.04
3/16 x 5/16 "	.08	3/8 x 7/16 " 8 "	.02	4 1/8 " 5 x 7 1/8 " 8 "	.05
3/16 x 3/8 "	.06	7/16 x 1/2 " 8 "	.02	5 1/8 " 6 x 5 1/8 " 8 "	.05
3/16 x 7/16 to 5/8 Inch	.04	1/2 x 9/16 " 8 "	.02	6 1/8 " 7 x 6 1/8 " 7 "	.06
3/16 x 11/16 " 2 Inches	.03	9/16 x 2 1/8 " 8 "	.02	6 1/8 " 8 x 7 1/8 " 8 "	.07
3/16 x 2 1/8 " 7 "	.02				

Intermediate sizes take next higher prices.
Annealing 1 cent per pound extra.

CUTTING TO SPECIFIED SINGLE AND MULTIPLE LENGTHS

24 Inches or Over	.01	12 to 18 Inches	.03
18 to 24 Inches	.02	6 " 12 "	.04

Cutting to less than 6 inches, special price.

HIGH SPEED STEEL

ROUNDS, SQUARES AND OCTAGONS

5/8 to 2 Inches	Base	4 5/8 to 5 Inches	.09	7/16 to 3/8 Inch	.07
2 1/8 " 2 1/2 "	.04	5 1/8 " 5 1/2 "	.10	5/16 " 11/32 "	.12
2 5/8 " 3 "	.05	5 5/8 " 6 "	.11	1/4 " 9/32 "	.17
3 1/8 " 3 1/2 "	.06	6 1/8 " 6 1/2 "	.12	3/16 Inch	.20
3 5/8 " 4 "	.07	6 5/8 " 7 "	.13		
4 1/8 " 4 1/2 "	.08	9/16 " 1/2 "	.04		

FLATS

5/8 to 2 x 5/8 to 2 In.	Base	5/16 x 3/8 to 5/8 In.	.10	1/2 x 1 1/8 to 6 In.	.04
1/8 x 3/16 In.	.80	5/16 x 3/4 " 1 "	.07	9/16 x 5/8 " 1 "	.05
1/8 x 1/4 "	.60	5/16 x 1 1/8 " 4 1/2 "	.06	9/16 x 1 1/8 " 6 "	.04
1/8 x 5/16 "	.40	3/8 x 7/16 " 3/4 "	.06	5/8 to 2 x 2 1/8 to 4 In.	.04
1/8 x 3/8 to 2 In.	.28	3/8 x 7/8 " 1 1/2 "	.06	5/8 " 2 x 4 1/8 " 7 "	.08
3/16 x 1/4 " 3 "	.28	3/8 x 1 5/8 " 5 "	.05	2 1/8 " 3 x 2 1/8 " 4 "	.04
1/4 x 5/16 " 1/2 "	.16	7/16 x 1/2 " 1 "	.06	2 1/8 " 3 x 4 1/8 " 7 "	.08
1/4 x 5/8 " 1 "	.10	7/16 x 1 1/8 " 5 1/2 "	.05		
1/4 x 1 1/8 " 4 "	.06	1/2 x 5/8 " 1 "	.05		

Intermediate sizes take next higher extra.
Annealing 4 cents per pound extra.
Bevels, same classification as flats plus 10 cents per pound for shape.

CUTTING TO SPECIFIED SINGLE AND MULTIPLE LENGTHS

24 Inches and Over	.02	12 to 17 15/16 Inches	.06
18 to 23 15/16 Inches	.04	6 " 11 15/16 "	.08

Cutting to less than 6 inches, special price.

CRESCENT DRILL STEELS

MINING DRILL STEEL

Fig. 19107A

Crescent grades for mining drill purposes give long service and eliminate losses caused by breakages and frequent re-dressings. The objectionable feature of most drill steels is their tendency to crystallize in service, but Crescent Mining Drill Steels are free from that fault.

These steels are made in all the standard shapes and, in addition to the rounds, octagons and hexagons, we furnish an extensive line of grooved sections.

Prices upon application.

HOLLOW DRILL STEEL

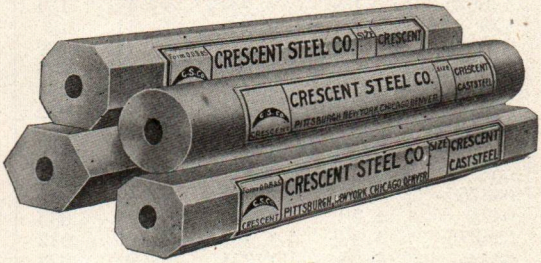


Fig. 19107B

Hollow Drill Steel is made in every commercial shape. The hole is as near the exact center of the bar, and as uniform in size and shape throughout, as mechanical exactness and accuracy can make it. Its finish is clean and smooth, and there is no tendency to crack around the hole in the working of the drill, a fault so often found in Hollow Drill Steel made by other processes.

Prices upon application.

GROOVED MINING DRILL STEEL

ROCKY MOUNTAIN PATTERN

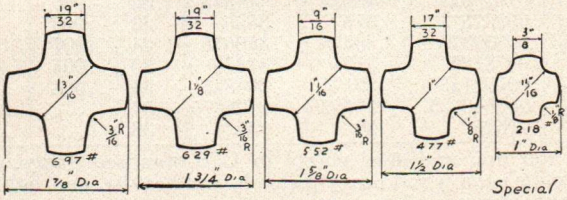


Fig. 19107C

Among the various types of grooved mining drill steel, the Rocky Mountain and the Cruciform patterns, in the Crescent grades, are extremely popular. The Rocky Mountain pattern is made in sizes from ¾ inches to 2½ inches in diameter, the Cruciform pattern in sizes from ⅞ inches to 2¼ inches in diameter.

Prices upon application.

SHEET IRON AND STEEL

WEIGHTS OF SHEET IRON AND STEEL—STANDARD GAUGES

U. S. Standard Gauge					Birmingham Gauge			
No. of Gauge	Thickness in Inches		Weight, per Square Foot, Pounds		No. of Gauge	Thickness in Inches	Weight, per Square Foot, Pounds	
	Fractions	Decimals	Iron	Steel			Iron	Steel
0000000	1/2	.5	20.	20.4	....	....	.....	.....
000000	15/32	46875	18.75	19.125	....	....	.....	.....
00000	7/16	.4375	17.50	17.85	....	....	.....	.....
0000	13/32	.40625	16.25	16.575	0000	.454	18.22	18.46
000	3/8	.375	15.	15.30	000	.425	17.05	17.28
00	11/32	.34375	13.75	14.025	00	.38	15.25	15.45
0	5/16	.3125	12.50	12.75	0	.34	13.64	13.82
1	9/32	.28125	11.25	11.475	1	.3	12.04	12.20
2	17/64	.265625	10.625	10.8375	2	.284	11.40	11.55
3	1/4	.25	10.	10.2	3	.259	10.39	10.53
4	15/64	.234375	9.375	9.5625	4	.238	9.55	9.68
5	7/32	.21875	8.75	8.925	5	.22	8.83	8.95
6	13/64	.203125	8.125	8.2875	6	.203	8.15	8.25
7	3/16	.1875	7.5	7.65	7	.18	7.22	7.32
8	11/64	.171875	6.875	7.0125	8	.165	6.62	6.71
9	5/32	.15625	6.25	6.375	9	.148	5.94	6.02
10	9/64	.140625	5.625	5.7375	10	.134	5.38	5.45
11	1/8	.125	5.	5.1	11	.12	4.82	4.88
12	7/64	.109375	4.375	4.4625	12	.109	4.37	4.43
13	3/32	.09375	3.75	3.825	13	.095	3.81	3.86
14	5/64	.078125	3.125	3.1875	14	.083	3.33	3.37
15	9/128	.0703125	2.8125	2.86875	15	.072	2.89	2.93
16	1/16	.0625	2.5	2.55	16	.065	2.61	2.64
17	9/160	.05625	2.25	2.295	17	.058	2.33	2.36
18	1/20	.05	2.	2.04	18	.049	1.97	1.99
19	7/160	.04375	1.75	1.785	19	.042	1.69	1.71
20	3/80	.0375	1.50	1.53	20	.035	1.40	1.42
21	11/320	.034375	1.375	1.4025	21	.032	1.28	1.30
22	1/32	.03125	1.25	1.275	22	.028	1.12	1.14
23	9/320	.028125	1.125	1.1475	23	.025	1.00	1.02
24	1/40	.025	1.	1.02	24	.022	.883	.895
25	7/320	.021875	.875	.8925	25	.02	.803	.813
26	3/160	.01875	.75	.765	26	.018	.722	.732
27	11/640	.0171875	.6875	.70125	27	.016	.642	.651
28	1/64	.015625	.625	.6375	28	.014	.562	.569
29	9/640	.0140625	.5625	.57375	29	.013	.522	.529
30	1/80	.0125	.5	.51	30	.012	.482	.488
31	7/640	.0109375	.4375	.44625	31	.01	.401	.407
32	13/1280	.01015625	.40625	.414375	32	.009	.361	.366
33	3/320	.009375	.375	.3825	33	.008	.321	.325
34	11/1280	.00859375	.34375	.350625	34	.007	.281	.285
35	5/640	.0078125	.3125	.31875	35	.005	.201	.203
36	9/1280	.00703125	.28125	.286875	36	.004	.....	.....
37	17/2560	.006640625	.265625	.2709375	37	....	.....	.....
38	1/160	.00625	.25	.255	38	....	.....	.....

Sheet mills roll iron and steel sheets to U. S. standard gauge, unless otherwise ordered. Plate mills usually roll heavy plates 3/16 and heavier, and light plates No. 8 to No. 12 to Birmingham gauge.

The low temperature (as compared with iron) at which steel plates have to be finished, causes a slight springing of the rolls, leaving the plate thicker in the center than on the edge. This is especially noticeable in plates less than 3/8 inch thick and over 66 inches wide which may be of full thickness on the edge and yet be as much as 1/8 inch thicker in the middle.

See variations for overweight, adopted by Association American Steel Manufacturers

MINING WIRE CLOTH

DOUBLE CRIMPED

4x4 MESH, .105 WIRE

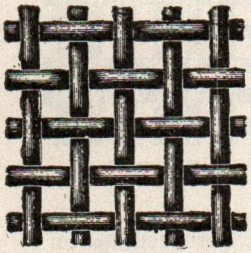


Fig. 30374A

10x10 MESH, .047 WIRE

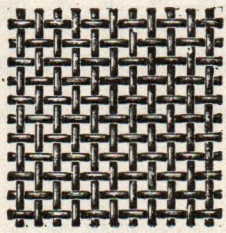


Fig. 30374B

30x30 MESH, .015 WIRE

Fig. 30374C

*D—Denver, S—Salt Lake City, E—El Paso.

STEEL

*Carried in Stock at	Opening of Space, Inches	No. of Wire	Diam. of Wire Decimal of an Inch	Price per Square Foot
S	¼	12	.105	.40
S	⅜	10	.135	.42
S	½	9	.148	.42
S	⅝	8	.162	.44
S	¾	7	.177	.48
S	1	5	.207	.50

Carried in Stock at	No. of Meshes per Lineal Inch	No. of Wire	Diam. of Wire, Decimal of an Inch	Price per Square Foot
D	¾	8	.162	.42
E	1	8	.162	.38
E	⅝	9	.148	.40
E	¾	9	.148	.38
D	1	9	.148	.32
D	⅝	10	.135	.25
D	¾	10	.135	.32
D, E	2	10	.135	.42
D	2½	10	.135	.50
D, E	3	10	.135	.60
D	2	12	.105	.30
D	3	12	.105	.40
D, S, E	4	12	.105	.60
D	2	14	.080	.20
D, S	4	14	.080	.38
D	6	14	.080	.60
D, S	5	15	.072	.40
D	3	16	.063	.20
D	4	16	.063	.27

STEEL

*Carried in Stock at	No. of Meshes per Lineal Inch	No. of Wire	Diam. of Wire Decimal of an Inch	Price per Square Foot
D, S	6	16	.063	.40
D, S	8	16	.063	.60
D	6	17	.054	.35
S	7	17	.054	.40
E	4	18	.047	.17
E	6	18	.047	.30
D, S, E	8	18	.047	.42
D, S, E	10	18	.047	.60
D	10	19	.041	.48
D	12	19	.041	.60
D, S	10	20	.035	.40
D, E	12	20	.035	.48
D	14	20	.035	.60
S	12	21	.032	.45
D	14	21	.032	.50
D, S	14	22	.028	.40
D	16	22	.028	.60
E	14	23	.025	.35
E	16	23	.025	.48
D	18	23	.025	.60
S	16	24	.023	.38
E	18	24	.023	.50
D	20	24	.023	.65
E	24	25	.020	.90
D	24	26	.018	.65
S	20	27	.017	.35
E	20	28	.016	.27
E	30	28	.016	.66
D	30	29	.015	.55
E	30	30	.014	.42

STEEL

*Carried in Stock at	No. of Meshes per Lineal Inch	No. of Wire	Diam. of Wire Decimal of an Inch	Price per Square Foot
S	30	31	.0132	.36
D	40	31	.0132	.95
E	35	32	.0128	.45
E	40	32	.0128	.75
S	40	33	.0118	.50

BRASS AND BRONZE

D	10	23	.025	.65
D, S	20	28	.016	.55
E	30	30	.014	.75
S	30	31	.0132	.70
E	40	31	.0132	1.60
D	30	32	.0120	.65
S	40	33	.0118	.85
D	40	34	.0100	.65
S, E	50	35	.0095	1.00
E	60	35	.0095	1.50
D	50	36	.0090	.80
S	60	36	.0090	1.25
D	60	40	.0070	1.70
S	70	40	.0070	1.00
D	80	44	.0058	1.25
S	80	45	.0055	1.25
D, S	100	50	.0044	1.75
D	120	Twilled	.0040	2.00
S	120	"	.0037	2.00
D	150	"	.0030	2.75
S	150	"	.0026	2.75
D	200	"	.0020	4.50
S	200	"	.0021	4.50

MINING WIRE CLOTH

3 x 3 MESH, No. 11 WIRE

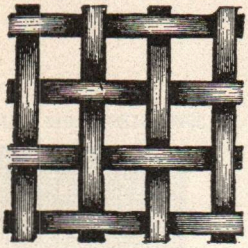


Fig. 7186A

4 x 4 MESH, No. 12

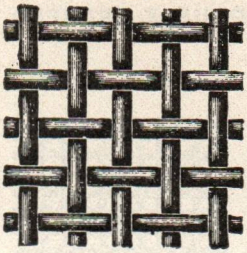


Fig. 7186B

6 x 6 MESH, No. 14

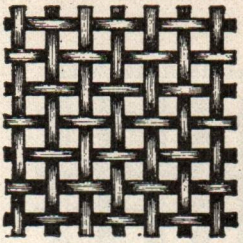


Fig. 7186C

8 x 8 MESH, No. 16

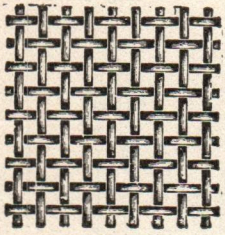


Fig. 7186D

10 x 10 MESH, No. 18

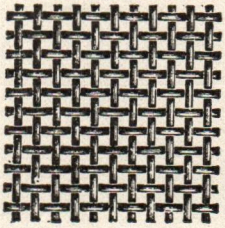


Fig. 7186E

12 x 12 MESH, No. 20

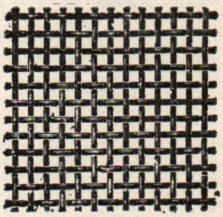


Fig. 7186F

14 x 14 MESH, No. 21

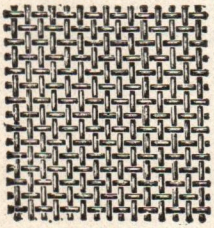


Fig. 7186G

16 x 16 MESH, No. 22

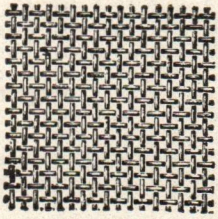


Fig. 7186H

18 x 18 MESH

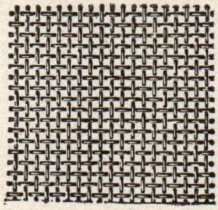


Fig. 7186J

30 x 30 MESH

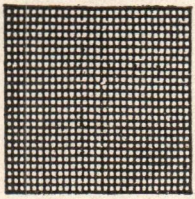


Fig. 7186K

35 x 35 MESH

Fig. 7186L

40 x 40 MESH

Fig. 7186M

TYLER STANDARD SCREEN SIEVES

This screen scale has as its base an opening of .0029 inch which is the opening in 200 mesh .0021-inch wire. It is the standard sieve as adopted by the Bureau of Standards of the United States Government, the openings increasing in the ratio of the square root of 2 or 1.414.

Where a closer sizing is required in the finer openings, a scale is shown below this table from 65 to 200 mesh, in which the openings increase in the ratio of the fourth root of 2 or 1.189.

Opening in Inches Ratio 2 or 1.414	Opening in Milli-meters	Mesh	Diam. Wire Decimals of an Inch	Price, Each — Brass Frames Covered with Brass Wire Cloth				
				6-inch Diam.	7-inch Diam.	8-inch Diam.	10-inch Diam.	12-inch Diam.
1.050	26.67	...	.149	**2.65**	**3.30**	**4.00**	**5.45**	**6.95**
.742	18.85	...	.135	**2.65**	**3.30**	**4.00**	**5.45**	**6.95**
.525	13.33	...	.105	**2.65**	**3.30**	**4.00**	**5.45**	**6.95**
.371	9.423	...	.092	**2.65**	**3.30**	**4.00**	**5.45**	**6.95**
.263	4.699	3	.070	**2.50**	**3.10**	**3.70**	**5.00**	**6.30**
.185	3.327	4	.065	**2.50**	**3.10**	**3.70**	**5.00**	**6.30**
.131	2.362	6	.036	**2.50**	**3.10**	**3.70**	**5.00**	**6.30**
.093	1.651	8	.032	**2.50**	**3.10**	**3.70**	**5.00**	**6.30**
.065	1.168	10	.035	**2.50**	**3.10**	**3.70**	**5.00**	**6.30**
.046	.833	14	.025	**2.30**	**2.85**	**3.40**	**4.50**	**5.65**
.0328	.589	20	.0172	**2.30**	**2.85**	**3.40**	**4.50**	**5.65**
.0232	.417	28	.0125	**2.30**	**2.85**	**3.40**	**4.50**	**5.65**
.0164	.295	35	.0122	**2.30**	**2.85**	**3.40**	**4.50**	**5.65**
.116	.208	48	.0092	**2.30**	**2.85**	**3.40**	**4.50**	**5.65**
.0082	.147	65	.0072	**2.30**	**2.85**	**3.40**	**4.50**	**5.65**
.0058	.104	100	.0042	**2.85**	**3.55**	**4.30**	**5.90**	**7.60**
.0041	.074	150	.0026	**3.55**	**4.50**	**5.50**	**7.75**	**10.20**
.0029	....	200	.0021	**4.75**	**6.15**	**7.60**	**10.95**	**14.75**

FOR CLOSER SIZING—65 TO 200-MESH

Opening in Inches Ratio 4–2 or 1.189	Opening in Milli-meters	Mesh	Diam. of Wire Decimals of an Inch	Price, Each				
				6-inch Diam.	7-inch Diam.	8-inch Diam.	10-inch Diam.	12-inch Diam.
.0082	.208	65	.0072	**2.30**	**2.85**	**3.40**	**4.50**	**5.65**
.0069	.175	80	.0056	**2.50**	**3.10**	**3.70**	**5.00**	**6.30**
.0058	.147	100	.0042	**2.85**	**3.55**	**4.30**	**5.90**	**7.60**
.0049	.124	115	.0038	**3.00**	**3.80**	**4.60**	**6.35**	**8.25**
.0041	.104	150	.0026	**3.55**	**4.50**	**5.50**	**7.75**	**10.20**
.0035	.088	170	.0024	**4.00**	**5.20**	**6.40**	**9.10**	**12.15**
.0029	.074	200	.0021	**4.75**	**6.15**	**7.60**	**10.95**	**14.75**
Brass Pan and Cover				**1.75**	**2.00**	**2.25**	**2.75**	**3.25**
Tinned Pan and Cover				**1.50**	**1.75**	**2.00**	**2.50**	**3.00**

Igann, 6 inches in diameter; Igasp, 7 inches in diameter; Igaza, 8 inches in diameter; Igbom, 10 inches in diameter; Igbug, 12 inches in diameter. Igevo, includes pan and cover.

When ordering testing sieves from this table, they must be specified as the Tyler Standard Screen Scale Sieves.

BRASS AND COPPER WIRE

BRASS, BRONZE AND GILDING WIRE IN COILS

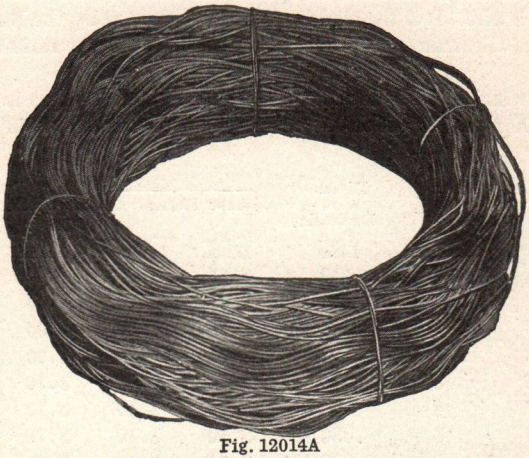


Fig. 12014A

EXTRAS OVER BASE PRICES

Number	8	9	10	11	12	13	14	15	16
Size ... inches	3.2	2.9	2.5	2.3	2.0	1.8	1.6	1.4	1.3
Price, Round ... each	Base	.01	.01	.01	.02	.02	.02	.03	.03
Price, Flat, Square and Half Round, "	.04	.05	.05	.05	.06	.06	.06	.07	.07
Number	17	18	19	20	21	22	23	24	....
Size ... inches	1.1	1.0	.9	.8	.7	.6	.6	.5	....
Price, Round ... each	.03½	.03½	.04½	.04½	.05½	.05½	.06	.06½	....
Price, Flat, Square and Half Round, "	.07½	.07½	.08½	.08½	.09½	.09½	.10	.10½	....

Sizes finer than No. 24, special prices quoted on application, not less than price of No. 24. All wire between gauges takes price of nearest gauge. Price of flat wire is governed by thinner dimension. Flat wire is material drawn in dies ⅜ inch wide and narrower, thinner than .090. Round wire smaller than No. 11 to No. 20, inclusive, straightened and cut to length 2 feet and over, .12 list advance, under 2 feet, add to .12. The list advance for cutting rods of corresponding length. Flat wire, over ¼ inch to ⅜ inch wide, inclusive, straightened and cut to length, same list advance as for cutting list slit metal. Flat wire, ¼ inch and narrower, straightened and cut to length, special prices.

SPOOLING WIRE

Weight ... pounds	1	5	10	15	20	25
List Advance ... each	.12	.06	.04	.02	.02	.02
Price, Net ... "	.05	.10	.10	.15	.15	.25

Coils of 5 or 10 lbs., same advances as for spooling for corresponding weights. Freight prepaid.

HARD AND SOFT DRAWN BARE COPPER WIRE, ROUND

B. & S. Gauge No.	Stubs' Gauge No.	Price, per Pound	B. & S. Gauge No.	Stubs' Gauge No.	Price, per Pound
0000 to 8	0000 to 10	Base	15 and 16	17 and 18	Add .00¾
	EXTRAS		17 " 18	19	" .01
9 and 10	11 and 12	Add .01⅛	19 " 20	20 " 21	" .01¼
11 " 12	13 " 14	" .01¼	21 " 22	22 " 23	" .01⅝
13 " 14	15 " 16	" .01½	23 " 24	24 " 25	" .02½

FLAT

The following extras should be added to the price of round wire, the diameter or gauge of which corresponds nearest to the thickness of flat wire.

Width, In.	Price, per Lb.	Width, In.	Price, per Lb.	Width, In.	Price, per Lb.
.500	.00½	.300 to .399	.01	.100 to .199	.03½
.400 to .499	.00¾	.200 " .299	.02	.050 " .099	.05

For wire finer than 24, special prices upon application.

SMOOTH STEEL WIRES

Decimal Equivalents		Full Sizes of Plain Wire	Sl. Wire Ga. No.	Sizes of Wire: Common Fractions	Sizes of Wire: Decimally	Weight One Mile Pounds	Lbs. per Foot	Feet to Pound
$\frac{1}{64}$=.0156	$\frac{33}{64}$=.5156		1		.2830	1128.0	.2136	4.681
$\frac{1}{32}$=.0312	$\frac{17}{32}$=.5312			$\frac{9}{32}$	.28125	1114.0	.211	
$\frac{3}{64}$=.0468	$\frac{35}{64}$=.5468		2		.2625	970.4	.1838	5.441
$\frac{1}{16}$=.0625	$\frac{9}{16}$=.5625			$\frac{1}{4}$	.250	880.2	.1667	
$\frac{5}{64}$=.0781	$\frac{37}{64}$=.5781		3		.2437	836.4	.1584	6.313
$\frac{3}{32}$=.0937	$\frac{19}{32}$=.5937							
$\frac{7}{64}$=.1093	$\frac{39}{64}$=.6093		4		.2253	714.8	.1354	7.386
$\frac{1}{8}$=.125	$\frac{5}{8}$=.625			$\frac{7}{32}$	.21875	673.9	.1276	
$\frac{9}{64}$=.1406	$\frac{41}{64}$=.6406		5		.2070	603.4	.1143	8.750
$\frac{5}{32}$=.1562	$\frac{21}{32}$=.6562							
$\frac{11}{64}$=.1718	$\frac{43}{64}$=.6718		6		.1920	519.2	.0983	10.17
$\frac{3}{16}$=.1875	$\frac{11}{16}$=.6875			$\frac{3}{16}$	.1875	495.1	.0937	
$\frac{13}{64}$=.2031	$\frac{45}{64}$=.7031		7		.1770	441.2	.0835	11.97
$\frac{7}{32}$=.2187	$\frac{23}{32}$=.7187							
$\frac{15}{64}$=.2343	$\frac{47}{64}$=.7343		8		.1620	369.6	.070	14.29
$\frac{1}{4}$=.25	$\frac{3}{4}$=.75			$\frac{5}{32}$	.15625	343.8	.0651	
$\frac{17}{64}$=.2656	$\frac{49}{64}$=.7656		9		.1483	309.7	.0586	17.05
$\frac{9}{32}$=.2812	$\frac{25}{32}$=.7812							
$\frac{19}{64}$=.2968	$\frac{51}{64}$=.7968		10		.1350	256.7	.0486	20.57
$\frac{5}{16}$=.3125	$\frac{13}{16}$=.8125			$\frac{1}{8}$	.1250	220.0	.0416	
$\frac{21}{64}$=.3281	$\frac{53}{64}$=.8281		11		.1205	204.5	.0387	25.82
$\frac{11}{32}$=.3437	$\frac{27}{32}$=.8437		12		.1055	156.7	.0296	33.69
$\frac{23}{64}$=.3593	$\frac{55}{64}$=.8593			$\frac{3}{32}$	.09375	123.8	.0234	
$\frac{3}{8}$=.375	$\frac{7}{8}$=.875		13		.0915	117.9	.0223	44.78
$\frac{25}{64}$=.3906	$\frac{57}{64}$=.8906		14		.0800	90.13	.0170	58.58
$\frac{13}{32}$=.4062	$\frac{29}{32}$=.9062		15		.0720	73.01	.0138	72.32
$\frac{27}{64}$=.4218	$\frac{59}{64}$=.9218		16	$\frac{1}{16}$	.0625	55.0	.0104	95.98
$\frac{7}{16}$=.4375	$\frac{15}{16}$=.9375							
$\frac{29}{64}$=.4531	$\frac{61}{64}$=.9531		17		.0540	41.07	.0077	128.6
$\frac{15}{32}$=.4687	$\frac{31}{32}$=.9687		18		.0475	31.77	.006	166.2
$\frac{31}{64}$=.4843	$\frac{63}{64}$=.9843		19		.0410	23.67	.0044	223.0
$\frac{1}{2}$=.5	1=1.0		20		.0348	17.05	.0032	309.6

ADVANCES PER 100 POUNDS ON PLAIN FENCE WIRE

Number	9 to $\frac{1}{2}$-inch, inclusive	10	11	12 and $12\frac{1}{2}$	13	14	15	16	17	18
Annealed	Base	.05	.10	.15	.25	.35	.45	.55	...	....
Galvanized, Additional	.70	.70	.70	.70	.70	.70	1.05	1.05	...	....

Even weight bundles of any weight, 5 cents per bundle extra, except 100-pound bundles, which are considered standard and take no extra charge.

STANDARD NAIL CARD

STEEL WIRE NAILS

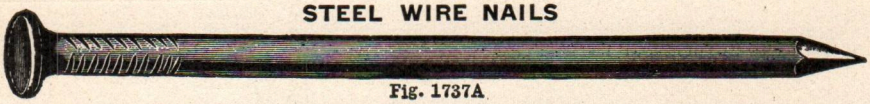


Fig. 1737A

AMERICAN STEEL AND WIRE CO.'S LIST OF EXTRAS FOR STEEL WIRE NAILS

Revised Feb. 1, 1910

PRICE, PER KEG

Common, Fence, Shingle, Tobacco, Flooring, and Common Brads

	Advances
20d to 60d	Base
10d " 16d	.05
8d and 9d	.10
6d " 7d	.20
4d " 5d	.30
3d	.45
2d	.70
3½d Shingle	.40

Barbed Common and Barbed Car Nails

15 cents advance over common.

Casing, Siding and Smooth Box Nails

10d and larger	.15
8d " 9d	.25
6d " 7d	.35
4d " 5d	.50
3d	.70
2d	1.00

Barbed box, 15 cts. advance over smooth.

Smooth Finishing Nails

10d and larger	.25
8d " 9d	.35
6d " 7d	.45
4d " 5d	.65
3d	.85
2d	1.15

Fine Nails

2d	1.00
2d, extra fine, 1x17	1.10
3d, 1⅛x15	.50
3d, extra fine, 1⅛x16	.65
4d	.50

Slating Nails

2d	.80
3d	.60
4d and 5d	.40
6d	.30

Hinge Nails

10d and larger	.50
8d	.60
6d	.70
4d	.80

Boat nails, 25 cents extra over hinge nails.

Galvanizing all standard nails at special prices.

Special heads, 15 cents per 100 pounds extra.

Special points, 15 cents per 100 pounds extra.

Barrel Nails

	Advances
⅝-inch	1.35
¾ "	1.00
⅞ "	.85
1 "	.70
1⅛ "	.60
1¼ "	.50
1⅜ "	.40
1½ "	.30

Barbed Roofing Nails

¾-inch	.75
⅞ "	.65
1 "	.60
1⅛ "	.60
1¼ "	.55
1½ "	.45
1¾ "	.45
2 "	.35

Clinch Nails, Annealed or Bright

2d	1.05
3d	.85
4d and 5d	.65
6d " 7d	.55
8d " 9d	.45
10d to 20d	.35

Spikes

All sizes to 9-inch	.10
10-inch and larger	.25

Special gauges, 10 cents additional.

Barbed Dowel Pins, No. 8

1¼, 1⅜, 1½-inch	.60
1⅛-inch	.60
1 "	.70
⅞ "	.85
¾ "	1.00
⅝ "	1.25

Annealed nails (except clinch, and hinge), 15 cents extra per 100 lbs.

Blued nails, 25 cents extra per 100 lbs

WROUGHT STEEL BUTTS AND BACK FLAPS

FAST JOINT

LIGHT NARROW BUTT, No. 838

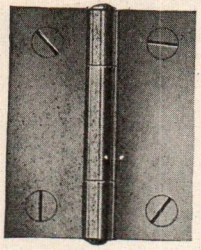


Fig. 8514A

BACK FLAP, No. 814

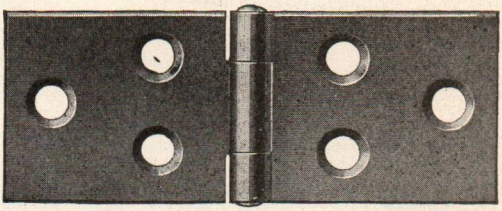


Fig. 8514B

No. 838 LIGHT NARROW BUTTS, BRIGHT

Length..... inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4
Width, Open.....inches	11/16	1	1 1/16	1 7/16	1 7/16	1 9/16	1 11/16	1 11/16	1 7/8
Size of Screws... number	2	3	4	5	5	6	6	6	7
Number of Screws to Pair	8	8	8	8	8	8	12	12	12
Price.....per dozen pairs	.40	.40	.50	.65	.80	.90	1.05	1.10	1.30
Length..... inches	3	3 1/4	3 1/2	3 3/4	4	4 1/2	5	5 1/2	6
Width, Open.....inches	2	2 1/8	2 1/4	2 1/2	2 7/8	3	3 3/16	3 11/16	3 15/16
Size of Screws...number	7	8	8	8	9	10	10	10	11
Number of Screws to Pair	12	12	12	12	16	16	16	16	16
Price .... per dozen pairs	1.45	1.70	2.00	2.70	2.85	3.70	4.60	6.00	7.10

No. 808 BROAD BUTTS, BRIGHT

Size, Open..... inches	2x2	2x2 1/2	2 1/2x2 1/2	2 1/2x3	3x2 1/2	3x3	3x3 1/2	3 1/2x3
Size of Screws..number	7	7	8	8	9	9	9	10
Number of Screws to Pair	8	8	12	12	12	12	12	12
Price... per dozen pairs	1.20	1.25	1.60	1.90	2.05	2.40	2.70	3.20
Size, Open..... inches	3 1/2x3 1/2	3 1/2x4	4x4	4 1/2x4 1/2	5x5	5 1/2x5 1/2	6x6	.....
Size of Screws..number	10	10	10	11	12	13	13	.....
Number of Screws to Pair	12	12	16	16	16	16	16	.....
Price... per dozen pairs	3.50	4.00	4.30	5.60	6.90	9.00	10.20	.....

No. 814 BACK FLAPS, BRIGHT

Size..... inches	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Width, Open.....inches	2 3/4	2 13/16	2 7/8	3	3 3/16	3 3/16	3 7/16
Size of Screws.....number	6	6	6	6	7	7	8
Number of Screws to Pair.....	8	12	12	12	12	12	12
Price.....per dozen pairs	.70	.75	.80	.90	1.00	1.10	1.20
Size..... inches	1 5/8	1 3/4	2	2 1/4	2 1/2	2 3/4	3
Width, Open.....inches	3 7/8	4	4 3/8	5 3/16	5 7/8	6 1/4	6 3/4
Size of Screws.....number	8	8	8	9	10	11	11
Number of Screws to Pair	12	12	12	12	12	12	16
Price..... per dozen pairs	1.30	1.45	1.70	2.35	3.40	3.90	**4.30**

WROUGHT STEEL STRAP AND "T" HINGES

STRAP HINGES

LIGHT

Fig. 273A

HEAVY

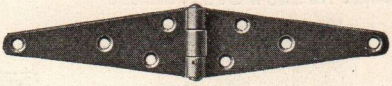


Fig. 273B

LIGHT

Size.....inches	3	4	5	6	7	8	10	12	14	16
Size of Screw.....number	6	7	8	9	10	10	10	11	12	12
No. " Screws to each Hinge.....	6	6	8	8	8	8	8	8	10	10
" " Dozen in Barrel.....	200	175	100	90	55	45	35	18	16	12
Price, Plain Steel.....per doz. pairs	.85	1.10	1.35	1.70	2.10	2.40	3.30	4.90	6.40	7.90
" Japanned..... " "	.95	1.20	1.50	1.90	2.30	2.65	3.65	5.40	7.05	8.70
" Galv., with Steel Pins.. " "	1.30	1.75	2.35	3.15	3.90	4.30	5.90	9.20	12.60	15.80
" " " Brass " .. " "	1.45	2.00	2.80	3.75	4.50	5.00	6.90	10.80	15.00	18.80

HEAVY

Size.....inches	4	5	6	8	10	12	14	16
Size of Screw.....number	9	9	11	12	13	14	16	16
No. " Screws to each Hinge.....	8	8	8	8	8	10	10	10
" " Dozen in Barrel.....	100	80	40	20	12	9	7	5
Price, Plain Steel.....per doz. pairs	1.60	2.15	2.80	4.50	6.80	10.40	12.20	14.00
" Japanned..... " "	1.75	2.35	3.10	4.95	7.50	11.45	13.40	15.40
" Galv., with Steel Pins.... " "	2.85	4.25	6.40	10.25	15.50	23.50	25.70	29.50
" " " Brass " .... " "	3.30	5.00	7.80	12.35	19.00	27.50	30.40	34.30

"T" HINGES

LIGHT

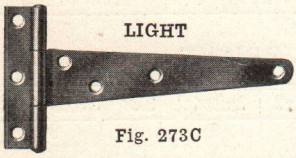


Fig. 273C

EXTRA HEAVY

Fig. 273D

LIGHT

Size.....inches	3	4	5	6	7	8	9	10	12	14	16
Size of Screw.....number	6	7	8	8	9	9	10	10	11	12	12
No. of Screws to each Hinge.....	6	6	7	7	7	7	8	8	8	9	9
" " Dozen in Barrel.....	175	150	100	80	60	50	40	30	20	15	15
Price, Plain Steel....per doz. pairs	.75	.80	1.00	1.20	1.35	1.50	1.90	2.20	3.00	3.90	5.15
" Japanned..... " "	.85	.90	1.10	1.30	1.50	1.65	2.10	2.40	3.30	4.30	5.65
" Galv., with Steel Pins " "	1.20	1.35	1.70	2.10	2.35	2.55	3.35	3.70	5.50	7.70	9.50
" " " Brass " " "	1.50	1.70	2.10	2.50	2.90	3.25	4.10	4.60	6.70	10.50	11.60

EXTRA HEAVY

Size.....inches	4	5	6	8	10	12	14	16
Size of Screw.....number	9	10	11	13	14	14	16	16
No. of Screws to each Hinge.....	6	8	8	8	9	10	10	10
" " Dozen in Barrel.....	80	50	30	20	10	8	6	5
Price, Plain Steel.....per doz. pairs	1.80	2.45	3.00	5.00	7.40	10.70	11.80	12.60
" Japanned..... " "	2.00	2.70	3.30	5.50	8.15	11.75	13.00	13.85
" Galv., with Steel Pins.... " "	3.20	4.65	6.00	10.00	14.25	21.20	23.00	24.50
" " " Brass " .... " "	3.90	6.00	8.50	13.50	19.00	28.00	30.00	31.50

LUMBERING TOOLS

MALLEABLE CLASP CANT HOOK

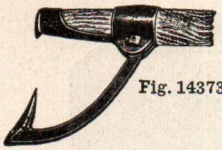


Fig. 14373A

MALLEABLE SOLID SMOOTH SOCKET PEAVIES

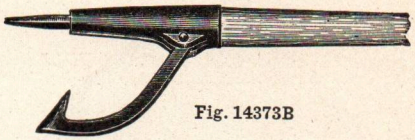


Fig. 14373B

MALLEABLE CLASP CANT HOOKS

Number	222	223	224	225	226	227	228	230	231	232
Size, Handles...	2½ in. x 4½ ft.	5 ft.	5½ ft.	2¾ in. x 4½ ft.	5 ft.	5½ ft.	6 ft.	3 in. x 5 ft.	5½ ft.	6 ft.
Price...per doz	19.20	19.80	20.40	22.20	22.90	23.50	24.20	28.50	29.10	29.80

Number	233	234	235	236	237	238	239	241	242	243
Size, Handles...	2½ in. x 4½ ft.	5 ft.	5½ ft.	2¾ in. x 4½ ft.	5 ft.	5½ ft.	6 ft.	3 in. x 5 ft.	5½ ft.	6 ft.
Price...per doz	21.80	22.50	23.20	25.20	25.80	26.40	27.00	31.90	32.60	33.30

Nos. 222 to 232, with select rock maple handles and duckbill hooks. Nos. 233 to 243, with select hickory handles and duckbill hooks.

MALLEABLE SOLID SMOOTH SOCKET PEAVIES

Number	906	907	908	909	910	911	912	914	915	916
Size, Handles...	2½ in. x 4½ ft.	5 ft.	5½ ft.	2¾ in. x 4½ ft.	5 ft.	5½ ft.	6 ft.	3 in. x 5 ft.	5½ ft.	6 ft.
Price...per doz.	23.40	24.00	24.60	26.90	27.50	28.10	28.80	30.90	31.50	32.10

Number	923	924	925	926	927	928	929	931	932	933
Size, Handles...	2½ in. x 4½ ft.	5 ft.	5½ ft.	2¾ in. x 4½ ft.	5 ft.	5½ ft.	6 ft.	3 in. x 5 ft.	5½ ft.	6 ft.
Price...per doz.	26.10	26.90	27.70	29.90	30.70	31.50	32.30	34.00	34.80	35.60

TIMBER CARRIERS OR LUG HOOKS

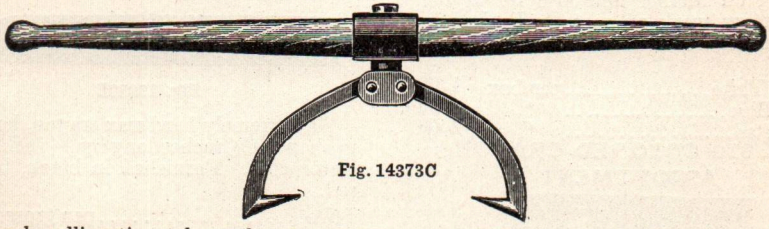


Fig. 14373C

For handling ties, telegraph poles, timbers, etc. Will grapple anything from 3 to 16 inches and is fitted with swivel to permit carrying timber through narrow passageways.

Price, No. 425, with 2½ In. x 4 ft. Maple Handles and Duckbill Hooks. .per dozen	23.30
" " 426, " 4½ Ft. Maple Handles and Duckbill Hooks..... "	23.90

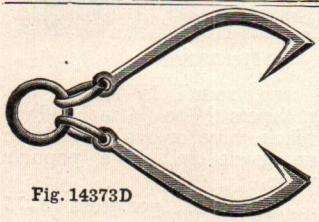


Fig. 14373D

GRAPPLE HOOKS

Made of high-grade tong steel with heavy upset points.

Price, No. 362, ¾ In. Oct. Steel.....per dozen	35.00
" " 363, ⅞ " " " ..... "	37.50
" " 544, 1 " " " ..... "	40.00
" " 545, 1⅛ " " " ..... "	46.90
" " 546, 1¼ " " " ..... "	52.20

CHALK AND CRAYONS

CARPENTER'S CHALK
No. 777

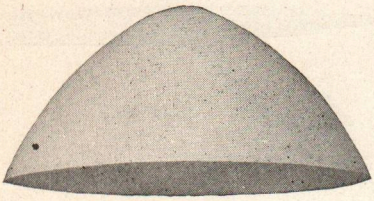


Fig. 19080A

Made in hemisphere cakes and can be furnished in white, red or blue. Used by carpenters, paper-hangers, machinists, etc. and is largely used for chalking lines,

BOXED

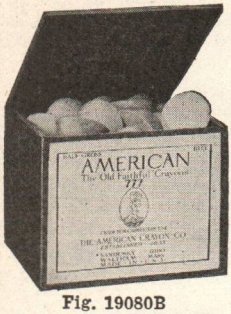


Fig. 19080B

marking on lumber and also for laying out pattern work on metal. Packed in lock-corner wood boxes containing one half gross.

Price,	White	per box	1.60
"	Blue	"	2.00
"	Red	"	2.00

No. 670 COLORED CRAYON ASSORTMENT

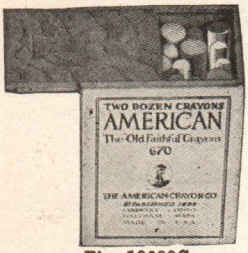


Fig. 19080C

A popular packing containing 24 assorted colors of No. 2 grade crayon, packed in upstanding boxes with sliding cover.

Price.....per box .50

EMPIRE TEXTILE MILL CRAYON

Fig. 19080D

This is a very soft colored chalk crayon, four inches long by one inch in diameter. These crayons are used in textile mills everywhere, for marking the cloth and in keeping track of the various twists of yarn that they may be running through the mill at the same time. A different color can be used for each twist, and in this way avoid any danger of getting them mixed. They have always given perfect satisfaction. Most of the colors wash out quite easily. They are the best textile mill crayons made. Samples cheerfully sent upon application. Made in practically all colors.

Price,	White	per gross	2.00
"	All Other Colors	"	3.00

LUMBER CRAYON

Fig. 19080E

An extremely hard wax crayon, hexagon in shape, 4⅝ inches long by ½ inch thick, waterproof. Furnished in black, blue or red.

Price.....per gross 11.00

MARKING CRAYON

Fig. 19080F

Medium size, round in shape, 3⅝ inches long, tapers 9/16 to 7/16 inch. Furnished in black, blue or red. Made in the medium grade and is a popular marking crayon.

Price.....per gross 3.75

STEEL FIGURES, LETTERS AND NAME STAMPS

Fig. 7699A

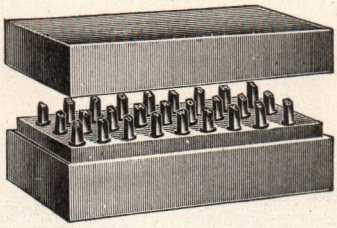


Fig. 7699B

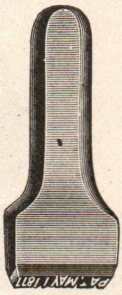


Fig. 7699C

Steel letters and figures are hand made from special steel, carefully hardened and tempered. Gothic style which gives clear, well defined impressions. Specially adapted for use on steel, iron, brass and other hard metals. Each set is put up in a neat, compact, dustproof wooden box, stained brown and varnished. Labeled in colors: Letters in red, figures in blue.

MACHINE MADE FIGURES AND LETTERS

Size	inches	1/32	1/20	1/16	1/12
Figures, Set of 9	per set	1.25	1.13	.90	.90
Letters, " " 28	"	3.75	3.39	2.70	2.70
" or Figures	each	.20	.20	.15	.15
Size	inches	3/32	1/10	1/8	5/32
Figures, Set of 9	per set	.90	.90	.90	1.13
Letters, " " 28	"	2.70	2.70	2.70	3.39
" or Figures	each	.15	.15	.15	.16
Size	inches	3/16	1/4	5/16	3/8
Figures, Set of 9	per set	1.25	1.50	1.75	2.50
Letters, " " 28	"	3.75	4.50	5.25	7.50
" or Figures	each	.18	.20	.25	.35
Size	inches	7/16	1/2	....	....
Figures, Set of 9	per set	3.50	4.50	....	....
Letters, " " 28	"	10.50	13.50	....	....
" or Figures	each	.45	.50	....	....

HAND MADE FIGURES AND LETTERS

Size	inches	1/32	1/24	1/20	1/16	1/12	3/32
Figures, Set of 9	per set	2.50	2.00	1.50	1.50	1.50	1.50
Letters, " " 28	"	7.50	6.00	4.50	4.50	4.50	4.50
" or Figures	each	.35	.30	.20	.20	.20	.20
Size	inches	1/10	1/8	5/32	3/16	7/32	1/4
Figures, Set of 9	per set	1.50	1.50	1.75	2.00	2.20	2.35
Letters, " " 28	"	4.50	4.50	5.25	6.00	6.50	7.00
" or Figures	each	.20	.20	.25	.30	.30	.35
Size	inches	5/16	3/8	7/16	1/2	....	....
Figures, Set of 9	per set	2.85	3.35	4.20	4.70	....	....
Letters, " " 28	"	8.50	10.00	12.50	14.00	....	....
" or Figures	each	.40	.45	.60	.65	....	....

Hand cut steel stamps are made to order and quoted on application.

YALE PADLOCKS

Nos. 223 AND 225 PADLOCKS

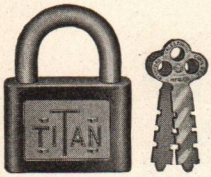


Fig. 30881A

No. 223 PADLOCKS

Size, 1½ inches. Iron, Bower-barffed case; panels, wrought steel brass-plated; steel shackle, brass-plated; 2 nickel-plated flat steel keys, 6 changes.

Price..... per dozen **6.00**

No. 225 PADLOCKS

Size, 2 inches; otherwise same as No. 223.

Price..... per dozen **7.95**

Nos. 453J AND 455J PADLOCKS

Fig. 30881B

No. 453J PADLOCKS

Size, 1½ inches, Warded type. Steel, ivory black case; malleable iron shackle, brass-plated, 2 nickel-plated flat steel keys, 6 changes.

Price, per doz. **2.60**

No. 455J PADLOCKS

Size, 2 inches; otherwise same as No. 453J.

Price.....per dozen **3.80**

No. 805F PADLOCKS

Fig. 30881C

2 inches, Iron, Bower-barffed case; bronze, buffed shackle; 4 pin tumblers; 2 nickel-plated flat steel keys to each lock.

Price .....per dozen **17.90**

No. 815 PADLOCKS

Fig. 30881D

Size, 1 inch. Cast bronze case; bronze wire shackle; 3 lever tumblers; 2 fluted nickel-bronze keys; 48 changes.

Price..... per dozen **20.00**

No. 8454 PADLOCKS

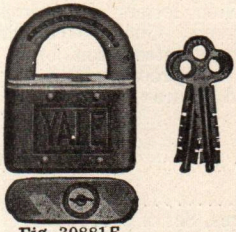


Fig. 30881E

Has 2-inch seamless steel case and steel shackle; 4 lever tumblers; 2 keys, 144 changes.

Price..... per dozen **20.85**

No. 8454½ PADLOCKS

Same as No. 8454 with the addition of 9 inches of 7B chain.

Price..... per dozen **23.85**

No. 9465 PADLOCKS

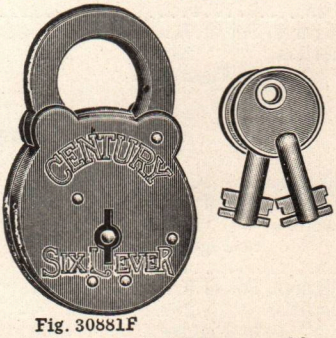


Fig. 30881F

Size, 2 inches. 6 steel lever tumblers. Steel, rolled-bright case; malleable iron shackle, nickel-plated; 2 double-bitted; malleable iron barrel keys, 12 changes.

Price.....per dozen **4.80**

YALE PADLOCKS

CARRIED IN STOCK AT OUR EL PASO BRANCH

No. 813 PADLOCKS

Fig. 30661A

Size, 1 inch. Bronze case and shackle, fine wheel finish; 3 lever-tumblers; fluted nickel-bronze keys; 48 changes.
Price.....per dozen **20.00**

No. 843 PADLOCKS

Fig. 30661B

1¾-inch bronze case and shackle, fine wheel finish, four lever tumblers, two fluted keys, 72 changes.
Price.....per dozen **28.05**

No. 853 PADLOCKS

Fig. 30661C

Size, 2 inches. Bronze case and shackle, fine wheel finish; 4 lever-tumblers; 2 fluted nickel-bronze keys; 144 changes.
Price.....per dozen **31.00**

No. 833 PADLOCKS

Fig. 30661D

Size, 1½ inches. Bronze case and shackle, fine wheel finish; 3 lever-tumblers; 2 fluted nickel bronze keys; 48 changes.
Price.....per dozen **25.00**

No. 833½ PADLOCKS

Same as No. 833 with the addition of 9 inches of 12T chain.
Price.....per dozen **29.20**

No. 840

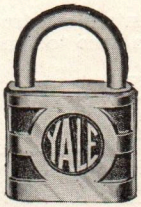


Fig. 30661E

No. 850

Fig. 30661F

No. 840 PADLOCKS

Has 1¾-inch cast bronze case; 5 pin tumblers; 2 paracentric, nickel-bronze keys to each lock; steel shackle.
Price.....per dozen **35.75**

No. 850 PADLOCKS

Has 2-inch cast bronze case; 5 pin tumblers; 2 paracentric, nickel-bronze keys to each lock; steel shackle.
Price.....per dozen **43.70**

BAILEY IRON AND WOOD PLANES

ADJUSTABLE IRON

No. 3 SMOOTH

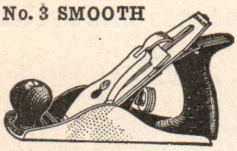


Fig. 807A

Bailey Iron Planes have been in use for 50 years and are the recognized.

No. 5 JACK

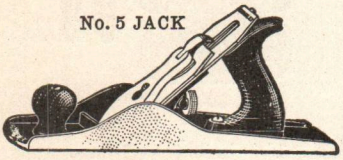


Fig. 807B

Standard for planes of this type. While retaining all the original features,

No. 6 FORE

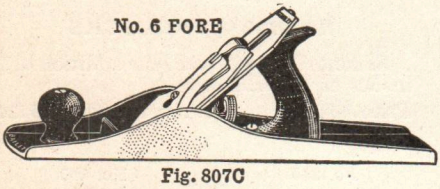


Fig. 807C

many valuable improvements in construction have been added from time to time.

No. 7 JOINTER

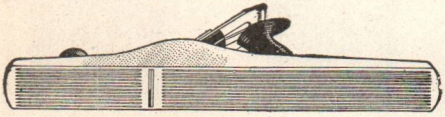


Fig. 807D

Only the finest of materials enter into their manufacture.

No.	Style	Lgth. In.	Cutter In.	Wt. Lbs.	Price Each
1	Smooth	5½	1¼	1¼	**1.50**
2	"	7	1⅝	2¼	**2.00**
3	"	8	1¾	3⅛	**2.10**
4	"	9	2	3¾	**2.20**
4½	"	10	2⅜	4¾	**2.50**
5	Jack	14	2	4¾	**2.50**
5½	"	15	2¼	6¾	**3.00**
6	Fore	18	2⅜	7¾	**3.25**
7	Jointer	22	2⅜	8⅛	**3.75**
8	"	24	2⅝	9¾	**4.50**

WOOD

No. 24 SMOOTH

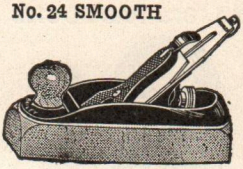


Fig. 807E

Bailey Wood Planes Supply the demand for a wood plane of superior quality.

No. 35, HANDLE SMOOTH

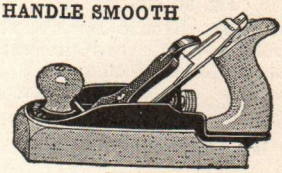


Fig. 807F

The bottom, handle and knob are made from selected and well-seasoned beech.

No. 27½ JACK

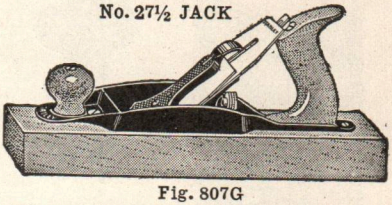


Fig. 807G

The cutters are the regular Bailey type, adjustable both endwise and sidewise.

No. 32 JOINTER

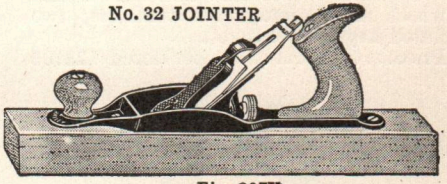


Fig. 807H

No.	Style	Lgth. In.	Cutter In.	Wt. Lbs.	Price Each
22	Smooth	8	1¾	2⅜	**1.50**
24	"	8	2	2⅞	**1.50**
25	Block	9½	1¾	2½	**1.50**
35	Handle	9	2	3¼	**1.90**
36	"	10	2⅜	4½	**2.05**
37	Jenney	13	2⅝	5	**2.20**
26	Jack	15	2	3¾	**1.65**
27½	"	15	2¼	4¾	**1.95**
28	Fore	18	2⅜	5½	**2.05**
31	Jointer	24	2⅜	6½	**2.25**
32	"	26	2⅝	7⅝	**2.40**

SAWS

BACK SAWS

No. 1 CAST STEEL, BEECH HANDLE, POLISHED EDGE, BLUED BACK

Fig. 4253A

Length.....inches	8	10	12	14	16	18
Price..... per dozen	9.00	10.00	12.00	14.00	16.00	18.00

COMPASS SAWS

No. 2 CRUCIBLE STEEL, APPLE HANDLE

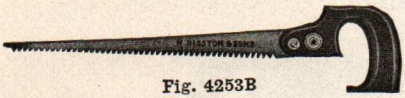


Fig. 4253B

No. 4 INTERCHANGEABLE

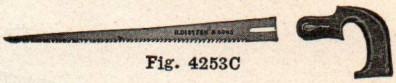


Fig. 4253C

Length .....inches	10	12	14	16	18
Price, No. 2.....per dozen	4.25	4.50	4.75	5.00	5.25
" " 2, Blades only..... "	2.25	2.50	2.75	3.00	3.25
" " 4..... "	4.00	4.25	4.50	4.75	5.00
" " 4, Blades only..... "	2.25	2.50	2.75	3.00	3.25

No. 15 KEYHOLE SAW BEECH HANDLE

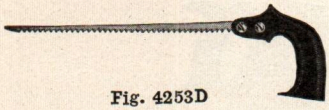


Fig. 4253D

KEYHOLE SAW AND PAD No. 5

Fig. 4253E

NO. 15 KEYHOLE SAWS

Length.....inches	10	12	14
Price.....per dozen	2.25	2.50	2.75

KEYHOLE SAW AND PAD, No. 5

Price, Keyhole Blades.....per dozen		1.40
" Handles.....	"	.60
" Complete.....	"	2.00

NEST OF SAWS, No. 3

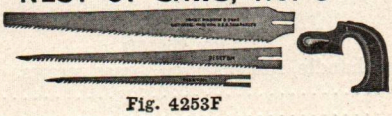


Fig. 4253F

Price, Handle and Tightener.....per dozen		1.75
" Keyhole Blades, 10 inches Long.....	"	2.00
" Compass " 14 " "	"	2.75
" Pruning " 16 " "	"	5.50
" Nests, Complete.....	"	12.00

DISSTON HAND SAWS

No. 12 WARRANTED EXTRA REFINED LONDON SPRING STEEL PATENT GROUND AND TEMPERED

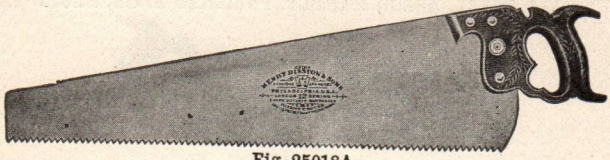


Fig. 25018A

Apple handle, carved and polished, brass screws.

Length.....inches	16	18	20	22	24	26	28	30
Price.....per dozen	**18.75**	**20.75**	**23.00**	**25.00**	**27.00**	**29.00**	**33.00**	**38.00**

Made with crosscut or rip teeth at same price.

WARRANTED REFINED CRUCIBLE STEEL, PATENT GROUND AND TEMPERED

No. D-8

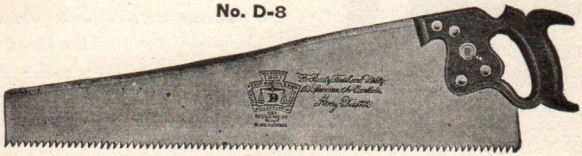


Fig. 25018B

Skewback, apple handle, full polished, brass screws.

Length.....inches	16	18	20	22	24	26	28	30
Price.....per dozen	**14.75**	**16.25**	**18.00**	**20.00**	**21.50**	**22.50**	**25.50**	**28.50**

No. D-20

Fig. 25018C

Skewback apple handle, carved and polished, brass screws.

Length.....inches	18	20	22	24	26	28
Price.....per dozen	**18.25**	**20.00**	**22.00**	**23.50**	**25.00**	**28.00**

Made with crosscut or rip teeth at same price.

No. D-17

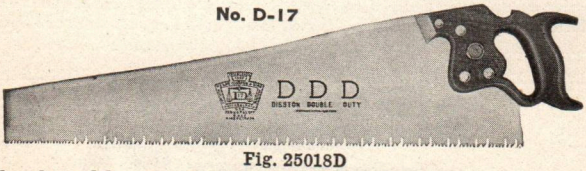


Fig. 25018D

Skewback, hardwood handle, full polished, brass screws.

Length.....inches	26
Price.....per dozen	**25.00**

SPECIAL SAWS

Warranted cast steel, beech handle, varnished edge, brass screws.

Length.....inches	16	18	20	22	24	26	28	30
Price, No. 405, Skewback..per dozen	**10.50**	**11.25**	**12.25**	**13.25**	**14.25**	**15.25**	**17.25**	....
" " 090, Straightback "	**6.20**	**6.65**	**7.15**	**7.80**	**8.40**	**9.00**	**11.10**	**12.50**

DISSTON CROSSCUT SAWS

No. 1 CHAMPION TOOTH

Fig. 26416A

Length ..... feet	4	4½	5	5½	6
Price, No. 1—4 Ga. Thinner on Back than on Tooth Edge	2.60	2.92	3.25	3.57	3.90
" " 2—2 " " " " " " " "	2.40	2.70	3.00	3.30	3.60
Length ..... feet	6½	7	7½	8	
Price, No. 1—4 Ga. Thinner on Back than on Tooth Edge	4.22	4.55	4.87	5.20	....
" " 2—2 " " " " " " " "	3.90	4.20	4.50	4.80	....

No. 1 TENON TOOTH

Fig. 26416B

Length ..... feet	4	4½	5	5½	6
Price, No. 1—4 Ga. Thinner on Back than on Tooth Edge	2.60	2.92	3.25	3.57	3.90
" " 2—2 " " " " " " " "	2.40	2.70	3.00	3.30	3.60
Length ..... feet	6½	7	7½	8	
Price, No. 1—4 Ga. Thinner on Back than on Tooth Edge	4.22	4.55	4.87	5.20	....
" " 2—2 " " " " " " " "	3.90	4.20	4.50	4.80	....

No. 286 TRIUMPH CHAMPION

Fig. 26416C

Length ..... feet	4	4½	5	5½	6	6½	7
Price ..... each	1.44	1.62	1.80	1.98	2.16	2.34	2.52

No. 598 TRIUMPH TOLEDO

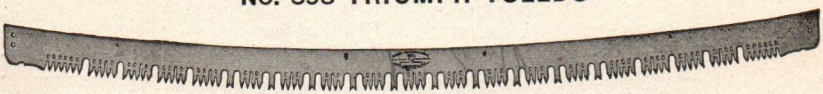


Fig. 26416D

Length ..... feet	4	4½	5	5½	6	6½	7
Price ..... each	2.20	2.48	2.75	3.02	3.30	3.58	3.85

No. 2 ONE-MAN CHAMPION

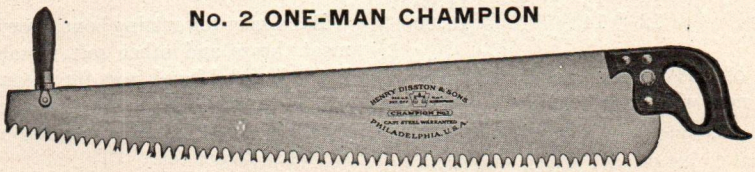


Fig. 26416E

Length ..... feet	3	3½	4	4½	5	5½	6
Width at Butt ..... inches	6¾	7	7¼	7½	7⅝	7⅞	8
Price ..... each	2.25	2.60	3.00	3.35	3.70	4.10	4.45

BAND SAWS

WIDE BAND SAWS

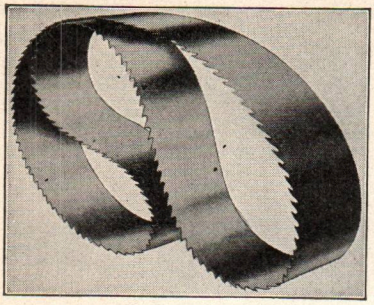


Fig. 1302A

Width Inches	Gauge	Price per Foot
2	18 to 20	.80
2½	18 " 20	1.00
3	18 " 20	1.20
3½	18 " 20	1.40
4	17 " 19	1.60
4½	17 " 19	1.80
5	17 " 19	2.00
5½	17 " 19	2.20
6	17 " 19	2.40
7	16 " 18	2.80
8	14 " 16	3.20
9	14 " 16	3.60
10	14 " 16	4.00
11	14 " 16	4.50
12	13 " 15	5.00
13	13 " 15	6.00
14	13 " 15	7.00
15	12 " 14	8.50
16	12 " 14	10.00
17	12 " 14	14.00
18	12 " 14	18.00

Saws of odd widths, not listed, take price of next wider size listed.

Saws of heavier gauge than listed, add 5 per cent to list of each gauge heavier.

No extra charge for saws one or two gauges thinner than list; when more than two gauges thinner, add 5 per cent to list of each gauge.

NARROW BAND SAWS

FILED AND SET

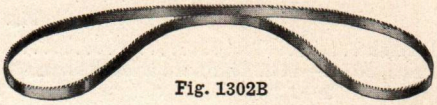


Fig. 1302B

Width Inches	Standard Gauge	Standard Teeth Points	Price per Foot
⅛	23	8	.14
3/16	23	7	.15
¼	22	6	.16
⅜	22	5½	.17
½	21	5	.18
⅝	21	4½	.20
¾	21	4	.22
⅞	21	4	.25
1	20	3½	.27
1⅛	20	3½	.29
1¼	20	3½	.31
1⅜	20	3	.35
1½	20	3	.38
1¾	20	3	.45

Narrow band saws with beveled backs, advance list 50 per cent for first gauge and 10 per cent for each additional gauge.

For band saws with knife edge, add 10 cents per foot to list. We make a specialty of band saws in coils, any length desired.

BRAZING

Width of Saw	Net per Braze
¼ to ½ inch	.20
⅝ " ⅞ "	.25
1 " 1¼ "	.30
1⅜ " 1¾ "	.35

SPECIAL BAND SAWS

Band saws for cutting bone, ivory, fiber, meat, brass and other soft metals; also B tooth metal band saws for cutting thin metals as above and thin iron and steel such as sheeting, etc., increase narrow band list 25 per cent.

DOUBLE-EDGE BAND SAWS

Add 10 per cent to list of single edge band saw.

HUTHER PATENT GROOVERS OR DADO HEADS

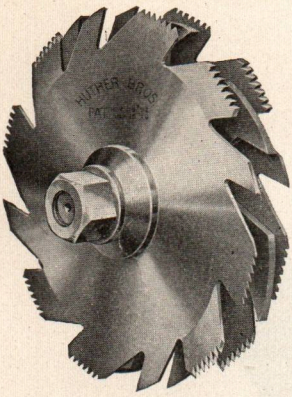


Fig. 2588A

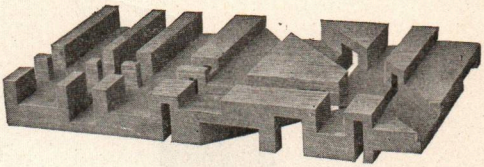


Fig. 2588B

This groover consists of two outside saws, each of which is a groover in itself, and as many inside cutters as required. The inside cutters are made 1/16, 1/8 and 1/4 inch thick, so that any width groove measurable in sixteenths may be cut. The outside cutters are made 1/8 inch thick.

It will cut a perfect groove, either with or across the grain, and will not leave a rough edge as is the case with ordinary groovers.

This tool is recommended to any person in need of a perfect groover, dado or gaining head.

The outside cut ers can be used singly, togeth r or in connection with as many or as few inside cutters as required to cut the necessary width groove.

Diameter.....inches	6	7	8	9	10
No. 1 Set.....per set	7.94	9.89	10.23	11.39	13.11
" 2 " ..... "	9.55	5.06	18.08	13.34	14.95
" 3 " ..... "	11.45	12.88	14.38	15.87	20.13
" 4 " ..... "	13.06	14.71	16.22	17.83	22.31
" 5 " ..... "	16.28	18.06	19.90	21.74	26.68
" 6 " ..... "	19.59	21.50	23.57	25.65	28.29
" 7 " ..... "	26.04	28.40	30.94	33.47	36.57
" 8 " ..... "	32.48	35.30	37.53	44.29	58.00

Diameter.....inches	11	12	14	16	18
No. 1 Set.....per set	14.85	17.37	20.47	23.81	25.65
" 2 " ..... "	17.04	19.78	23.46	27.49	29.79
" 3 " ..... "	20.13	23.00	27.14	31.51	34.59
" 4 " ..... "	29.10	25.42	30.13	35.19	38.64
" 5 "	26.68	30.25	36.11	42.55	46.92
" 6 " ..... "	31.05	35.08	42.09	49.91	53.76
" 7 " ..... "	39.79	44.74	49.35	64.63	71.80
" 8 " ..... "	48.53	54.40	66.01	79.35	87.40

Jointed and filed ready for use. In ordering, please state the number of set, diameter of groover and size of hole wanted. Extra inside cutters can be had at any time.

Groovers are arranged in sets as follows:

No. 1 Set, Cutting Grooves, 1/8, 1/4, 3/8.
" 2 " " " 1/8, 1/4, 3/8, 1/2, 5/8.
" 3 " " " 1/8, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4.
" 4 " " " 1/8, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1.
" 5 " " " 1/8, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1 1 1/16, 1 1/8, 1 3/16, 1 1/4, 1 5/16, 1 3/8, 1 7/16, 1 1/2.
" 6 " " " 1/8, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1, 1 1/16, 1 1/8, 1 3/16, 1 1/4, 1 5/16, 1 3/8, 1 7/16, 1 1/2, 1 9/16, 1 5/8, 1 11/16, 1 3/4, 1 13/16, 1 7/8, 1 15/16, 2.
" 7 " " " 1/8 to 3 Inches by 16ths.
" 8 " " " 1/8 " 4 " " 16ths.

HOE CHISEL-TOOTH CIRCULAR SAWS

No. 3 PATTERN—CHISEL BITS

Fig. 3740A

For hard wood and soft wood.

Diam. Inches	Gauge at Rim No.	Standard Number of Teeth in Saw	Greatest Number of Teeth that can be put in Saw	Number of Bits Given with Each Saw	Extra Shanks Given with Each Saw	Price Each
16	10	12	12	One Extra Set of Bits Furnished with Each Saw	2	27.00
18	10	14	14		2	30.00
20	9	14	16		2	34.00
22	9	16	18		2	38.50
24	9	18	18		2	42.00
26	9	18	20		2	46.00
28	9	18	22		2	50.00
30	9	20	24		2	54.00
32	8	22	26		2	61.00
34	8	22	28		2	66.00
36	8	24	30		2	72.00
38	8	24	32		2	78.00
40	8	26	34		2	84.00
42	8	28	36		3	94.00
44	8	30	38		3	102.00
46	8	32	40		3	110.00
48	8	34	42		3	120.00
50	8	36	44		3	134.00
52	7	38	44		3	156.00
54	7	40	46		3	174.00
56	7	42	48		3	194.00
58	7	44	50		3	212.00
60	7	46	52		3	230.00
62	6	48	54		3	260.00
64	6	48	56		3	290.00
66	6	50	58		3	320.00
68	6	52	60		3	350.00
70	6	54	62		3	380.00
72	6	56	64		3	420.00

HOE CHISEL BITS AND SHANKS

No. 3 BIT
FULL SIZE

Fig. 30544A

No. 3 SHANK
FULL SIZE

Fig. 30544B

Made in Nos. 2, 2½ and 3 patterns.

CHISEL BITS

Number	2	2½	3
Price ..... per 100	**4.75**	**4.75**	**4.75**

SHANKS

To fill an order for shanks we must have the following information. The catalogue number, whether regular, second size, or third size, also the gauge. For No. 2 shanks whether new or old style. For No. 2½ shanks, whether long or short. Unless straight or flush shanks are specified, flanged shanks will always be furnished.

Sometimes, when using thin saws with bits having narrow cutting points, straight or flush shanks may be used to advantage for either winter or summer work. This allows of cutting less kerf, as for instance, a ¼-inch bit in an 8-gauge saw. We make these although we do not recommend their use, as our famous flanged or swaged shank chambers the sawdust in better shape.

Number	2	2½	3
Price ..... each	**.45**	**.45**	**.45**

Shanks $\frac{1}{64}$ inch higher than regular are called second size. Shanks $\frac{1}{32}$ inch larger than regular are called third size.

HOE SOLID TOOTH SAWS

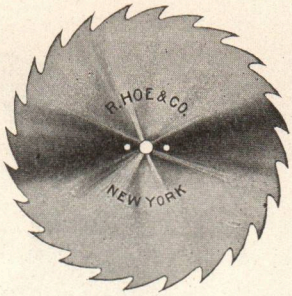


Fig. 30548A

Diam. Inches	Gauge No.	Size of Hole Inches	Price Each	Price Extra per Gauge	Net Prices Extra for Setting and Sharpening if Rip Saws	Cut-off Saws	Diam. Inches	Gauge No.	Size of Hole In.	Price Each	Price Extra per Gauge	Net Prices, Extra for Setting and Sharpening if Rip Saws	Cut-off Saws
6	18	¾	1.80	.05	.07	.10	42	8	2	47.00	2.60	....	.85
8	18	⅞	2.40	.08	.10	.13	44	8	2	55.00	3.00	....	.90
10	16	1	3.30	.12	.12	.16	46	8	2	65.00	3.50	....	1.00
12	15	1	4.40	.20	.15	.20	48	8	2	75.00	4.00	....	1.10
14	15	1⅛	5.30	.25	.18	.24	50	7	2	85.00	4.50	....	1.20
16	14	1⅛	6.50	.30	.20	.25	52	7	2	95.00	5.00	....	1.30
18	13	1¼	8.00	.40	.23	.28	54	7	2	105.00	6.00	....	1.40
20	13	1 5/16	9.50	.50	.25	.22	56	7	2	120.00	7.00	....	1.50
22	12	1 5/16	11.50	.60	.28	.35	58	7	2	135.00	8.00	....	1.60
24	11	1⅜	13.50	.70	.31	.40	60	6	2	150.00	9.00	....	1.70
26	11	1⅜	16.00	.85	.35	.50	62	6	2	170.00	10.00	....	1.80
28	10	1½	18.50	1.00	.38	.55	64	6	2	190.00	12.00	....	1.90
30	10	1½	21.00	1.15	.42	.60	66	6	2	210.00	15.00	....	2.00
32	10	1⅝	24.00	1.30	.45	.65	68	5	2	225.00	18.00	....	2.10
34	9	1⅝	27.00	1.60	.50	.70	70	5	2	265.00	21.00	....	2.20
36	9	1⅝	31.00	1.80	.55	.75	72	5	2	300.00	24.00	....	2.30
38	9	1⅝	35.00	2.00	.60	.75	74	5	2	340.00	27.00	....	2.40
40	9	2	41.00	2.30	.65	.80	76	5	2	390.00	30.00	....	2.50

No extra charge for beveling one gauge. A slight additional charge is made for beveling more than one gauge.

No extra charge for saws one gauge heavier than list.

A slight additional charge for saws 24 inches and less when made more than one gauge thinner than list.

Saws 48 inches and larger, when made thinner than 10 gauge, are not guaranteed, and there is an extra charge.

SIDE FILES AND SAW SETS

ADJUSTABLE

No. 1
FOR CIRCULAR SAWS

Fig. 1346A

No. 2
FOR BAND, GANG
AND CIRCULAR SAWS

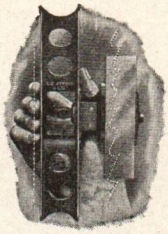


Fig. 1346B

No. 3
FOR BAND SAWS

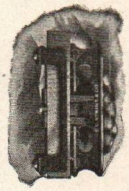


Fig. 1346C

The No. 1 File is the simplest tool ever invented for the purpose. The width of the set or swaged tooth is regulated by a single set screw.

Clamp for holding the file is adjustable, permitting the use of any kind of a file, if one of our files made especially for them can not be easily obtained. This tool is especially adapted for circular saws.

No. 2 File is adjustable for holding any kind of a file similar to the No. 1, and by its shape is peculiarly adapted for long saws, such as band and gang saws. It can be used on blades down to two inches in width and as wide as desired. No one who runs such saws should be without this tool.

It is also preferred by some on circular saws.

The No. 3 file is adjustable for holding 8-inch and 9-inch files, and so arranged that the file can be tilted to any desired angle.

A gauge passes over the points of the teeth, bringing the file in proper position for doing the work. For all long saws. Can be used on any width of blade.

Number		1	2	3
Price	each	1.00	1.00	1.00
" Extra Files	per dozen	3.00	3.00	3.60

MORRILL'S SAW SETS

Nos. 3 and 4

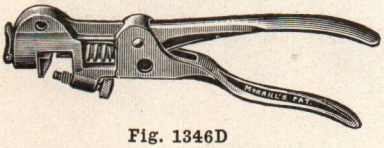


Fig. 1346D

No. 5

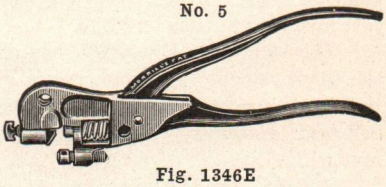


Fig. 1346E

No. 3	9-inch, for Cross-cut and Circular Saws from 14 to 20 Gauge	per dozen	36.00
" 4.	9 " " "M" Champion and Double Toothed Saws from 14 to 20 Gauge	"	36.00
" 5.	15 " " Timber and Board Saws from 6 to 14 Gauge	"	54.00

MIXTER PATENT CHAMPION GUMMERS

WITH AUTOMATIC SELF-FEED

No. 1, LARGE SIZE

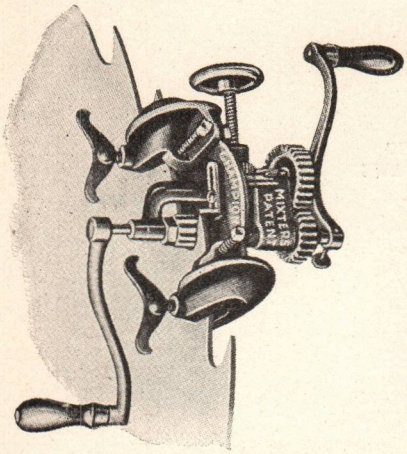


Fig. 12338A

The illustration represents Mixter's Famous Champion Gummer No. 1 with patent adjustable automatic self-feed. It can be regulated at will to feed faster or slower, according to the work to be performed, and can be changed in an instant from self to hand-feeding. It is self-acting, throwing out of gear when the teeth are cut to the required depth, making them of uniform length.

The Champion has the lateral or oscillating movement of the cutter, and is fully adjustable to all kinds of saws, from the largest circular to the smallest in general use; also mill and crosscut saws. The line of the teeth can be cut at any angle desired from horizontal to perpendicular. It cuts very rapidly, and with no risk of bending, breaking or casehardening the saw.

Weight, 22 pounds, boxed.

Price, No. 1, Patent Automatic Self-feeding Gummer, including Three Cutters (Usual Size, ¾, ⅞ and 1 Inch) Grinder and Wrench.....each **25.00**
" Extra Arbors for ⅜, ½ and ⅝-inch Cutters .....net, each **2.00**
" " " " ½, ⅝ " ¾ " " ..... " " **2.00**

No. 2, SMALL SIZE

The illustration represents the No. 2 Patent Self-feed Champion Gummer in position to gum mill saws or crosscut saws.

This size is especially adapted for crosscut saws and small and medium circular saws, etc. Shingle mills, planing mills, sash, door and blind factories, wagon and carriage, pattern and furniture shops, all need this gummer. It is also especially handy for lumbermen to carry in the woods for gumming crosscut saws. It will soon pay its cost in saving of time and files.

The small size Champion has all the improvements and advantages of the large size Champion Automatic Self-feed Gummer. Full directions sent with each.

IN POSITION FOR GUMMING MILL AND CROSSCUT SAWS

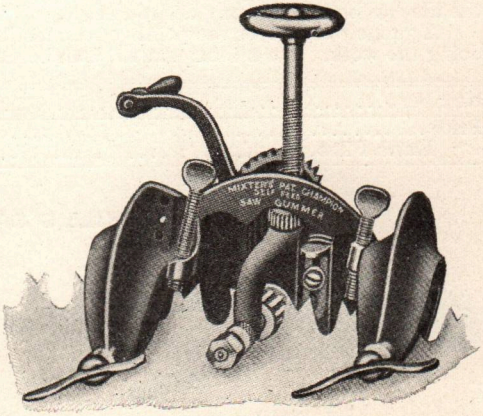


Fig. 12338B

Weight, boxed, 17 pounds.

No. 2 Mixter Patent Automatic Self-feeding Champion Gummer, including Three Cutters ½, ⅝, and ¾-inch, Grinder and Wrench..... **25.00**
Extra Arbor for ⅜, ½ and ⅝-inch Cutters, net..... **1.50**

SAW GUMMERS

VICTOR SELF-FEEDING SAW GUMMERS

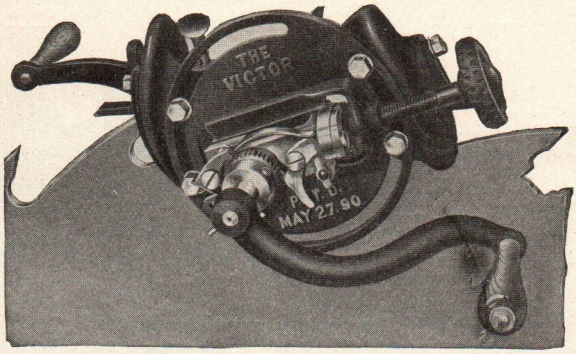


Fig. 12455A

Price, Complete with One Cutter Shaft, Cutter Grinder and Three Cutters, each	18.00

In ordering gummers, state size of cutters wanted. Extra shafts can be furnished with the gummers at 2.00 each, so that all above sizes can be used in one machine if so desired.

PARTS OF VICTOR SELF-FEEDING SAW GUMMERS

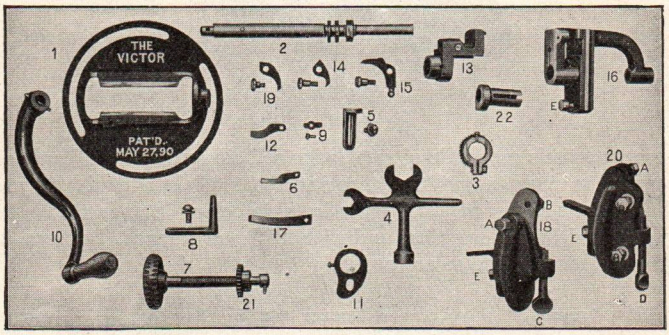


Fig. 12455B

1, plate; **2**, shaft; **3**, No. 1 ratchet; **4**, wrench; **5**, brass gauge; **6**, No. 2 ratchet spring; **7**, feed screw; **8**, stop gauge; **9**, stop; **10**, crank; **11**, throw; **12**, No. 1 ratchet spring; **13**, stand; **14**, No. 1 pawl; **15**, ball lever; **16**, carriage; **17**, ball lever spring; **18**, long clamp; **19**, No. 2 pawl; **20**, short clamp; **21**, No. 2 feed ratchet; **22**, cam.

When ordering, specify the number of part and name of gummer. Prices on application.

GUMMER CUTTERS

Size.....inches	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Price.....each	.23	.23	.23	.27	.32	.37	.40	.45	.50	.55

Cutters for No. 2 gummer have a 5/16-inch hole. Cutters for No. 1 gummer have a 9/16-inch hole. The 1 to 1 1/2-inch cutters are for the No. 1 gummer and the 1/2 to 7/8-inch for the No. 2 gummer.

AMERICAN SAW MANDRELS

STYLE A

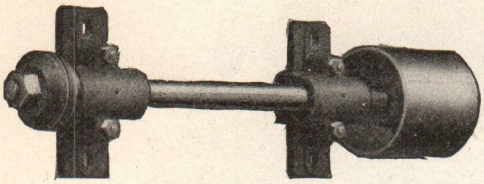


Fig 14447A

STYLE B

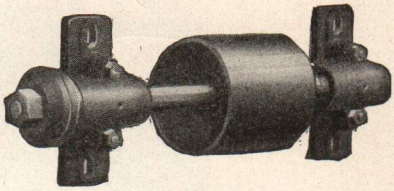


Fig. 14447B

STYLE D

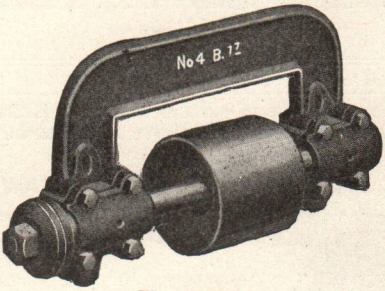


Fig. 14447C

These saw mandrels are made of steel, with self-oiling babbitted bearings. They are fitted in a careful manner and will run true and cool. We can furnish them in any style shown in illustrations and of any size given in table below. Standard mandrels are made with pulley to the right of the collars and with left-hand threads, but can be furnished with right-hand threads, when so ordered.

	Length, Inches			Size of Pulley Inches				Largest	Price, Each		
Number	Style A	Style B	Style D	Diam. Inches	Diam.	Face	Fit Saw Hole Inches	Saw Can be Used Inches	Style A	Style B	Style D
1	19	16	19½	1⅛	3	4	1	18	**9.00**	**8.50**	**13.00**
2	24	20	21½	1 3/16	4	4½	1⅛	24	**11.40**	**10.50**	**14.70**
3	26	22	23½	1 5/16	5	5	1¼	26	**13.40**	**12.50**	**16.80**
4	30	26	25½	1 7/16	6	6	1¼	30	**16.80**	**15.80**	**19.00**
5	36	30	28¼	1 11/16	6	8	1½	36	**21.00**	**20.00**	**23.00**
6	36	36	28¼	1 15/16	8	8	1⅝	42	**23.00**	**23.00**	**26.40**
7	48	48	....	1 15/16	8	10	1⅝	42	**25.00**	**25.00**	.....
8	36	36	36	2 3/16	10	10	2	48	**27.50**	**27.50**	**39.50**
9	48	48	....	2 3/16	12	10	2	48	**32.00**	**32.00**	.....

Double-end mandrels, add 50 per cent to list.

Mandrels A and B made longer than regular, add 10 per cent to list for each additional foot or fraction thereof.

Larger sizes or special mandrels made to order. When ordering, give length over all. Also state whether pulley is wanted on right or left, as saw runs toward you.

PILLEY'S WIRE BRUSHES AND BROOMS

CASTING OR FOUNDRY BRUSHES

No. 700

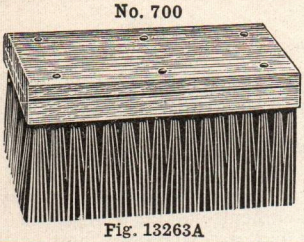


Fig. 13263A

No. 705

Fig. 13263B

Number	700			705—with Handle				
Number of Rows	4	5	6	2	3	4	5	6
Price, 2-inch Wire....per dozen	4.50	5.50	6.50	3.00	4.00	5.00	6.00	7.00
" 3 " ..... "	5.50	6.50	7.50	4.00	5.00	6.00	7.00	8.00
" 4 " ..... "	6.50	7.50	8.50	5.00	6.00	7.00	8.00	9.00
" 5 " ..... "	7.50	8.50	9.50	6.00	7.00	8.00	9.00	10.00
" 6 " ..... "	8.50	9.50	10.50	7.00	8.00	9.00	10.00	11.00

SCRATCH BRUSHES

No. 740

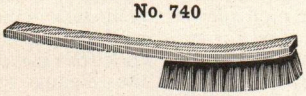


Fig. 13263C

No. 748

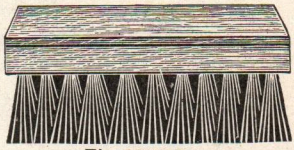


Fig. 13263D

Price, No. 740, Three-Row, 1¼-inch Wire.....per dozen	10.00
" " 748, Six " 1½ " " ..... "	10.00
" " 749, " " 2½ " " ..... "	12.00

BROOMS

No. 785—FLAT WIRE

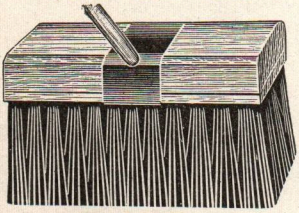


Fig. 13263E

No. 790—ROUND WIRE

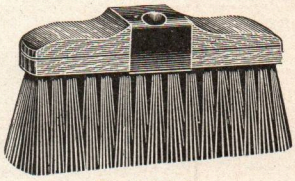


Fig. 13263F

No. 785

Number of Rows	4			5		
Length.....inches	12	14	16	12	14	16
Price, 5-inch Wire.....each	12.00	16.00	20.00	14.00	18.00	22.00

No. 790

Size of Wire.....inches	2½	3½
Price.....per dozen	20.00	22.00

TINNERS' TOOLS

FORGED STEEL TINNERS' SNIPS

REGULAR PATTERN

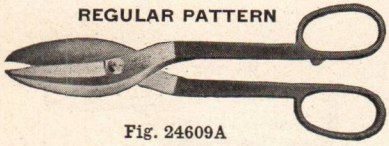


Fig. 24609A

Number.....	12	11	10	9
Full Length....in.	8	9½	11½	12½
Length of Cut..“	2	2¼	2½	3
Price.....each	**2.90**	**3.50**	**4.80**	**5.10**
Number.....	8	7	6½	....
Full Length....in.	13¾	14½	15¾	....
Length of Cut..“	3½	4	4½	....
Price.....each	**5.90**	**7.40**	**8.80**	....

CIRCULAR PATTERN

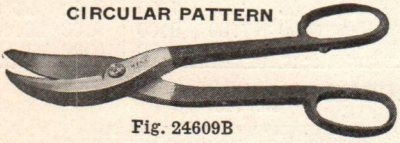


Fig. 24609B

Number.....	12CB	11CB	10CB	9CB
Full Length...in.	8	9½	11½	12½
Length of Cut.“	2	2¼	2½	3
Price.....each	**5.20**	**5.90**	**7.20**	**8.10**
Number.....	8CB	7CB	6½CB	....
Full Length...in.	13¾	14½	15¾	....
Length of Cut.“	3½	4	4½	....
Price.....each	**8.80**	**10.30**	**12.60**	....

COMBINATION PATTERN

Combination Pattern Snips made with straight blades, but are ground and shaped in such a manner that they will cut curves as well as straight work.

Number.....	100	19	18
Full Length.....in.	11½	12½	13½
Length of Cut..... “	2½	3	3½
Price.....each	**5.30**	**6.00**	**6.70**

BENCH SHEARS

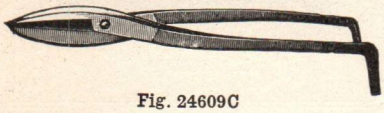


Fig. 24609C

Number	00	0	1	2
Weight.....pounds	36	30	24	19
Length of Cut....in.	11½	10½	9	8¾
Price.....each	**13.50**	**12.00**	**8.00**	**7.00**
Number	3	4	5	6
Weight.....pounds	13	12	9	8¼
Length of Cut....in.	7⅝	7⅜	6¼	5¼
Price.....each	**6.00**	**5.00**	**4.00**	**3.50**

BARTLETT COMPOUND LEVER SNIPS

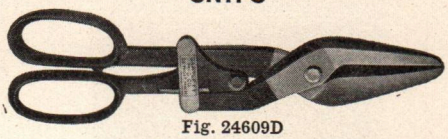


Fig. 24609D

No. 7 snips are suitable in any work where difficult cutting is required. They weigh but a few ounces and easily cut metal 24 gauge, or thinner. Stamped from crucible tool steel.

The No. 8 size is drop-forged crucible tool steel, has cutting strength equal to the largest size of common snips, and will cut 20 to 22 gauge easily.

No. 10, made from drop-forged crucible tool steel, cuts 20 gauge or multiples of thinner gauges and is used extensively by furnace men and cornice makers.

No. 12 size is made of drop-forged crucible tool steel, capable of cutting seams or multiples of thicknesses in metal work; is used for splitting large sheets and for many classes of work that usually require bench shears. Cuts 18 gauge easily.

No. 14 size is suitable for those who require a large size snip for bench work.

Size Inches	Total Length Inches	Length of Blade Inches	Length of Cut Inches	Price Each
7	7	1½	1¼	**1.50**
8	8	2	1¾	**2.00**
10	10½	3	2½	**3.00**
12	12	3½	3	**4.00**
14	14	4¼	3½	**4.60**

SOLDERING COPPERS

Fig. 24609E

Weight, per Pair, Pounds		
Pointed		Flat
1	6	2
1½	7	3
2	8	4
2½	9	5
3	10	6
4	12	7
5	..	8
Price.....per pound		**1.00**

SCREENS AND RIDDLES

SCREENS

SAND COILED WIRE

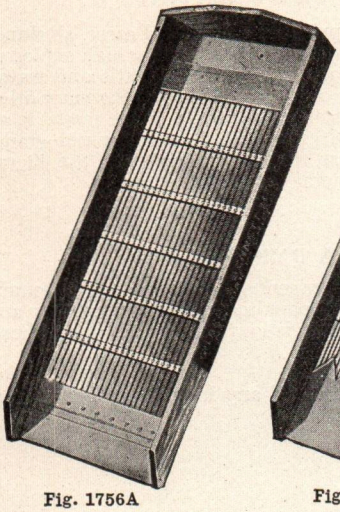


Fig. 1756A

SAND LACED

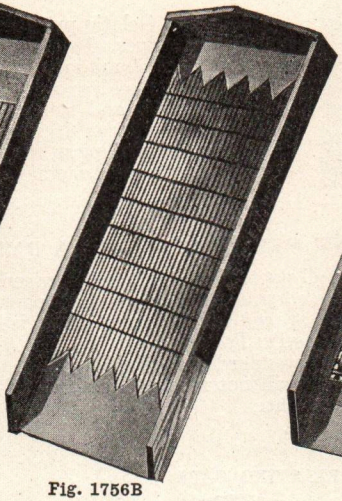


Fig. 1756B

COAL CRIMPED WIRE

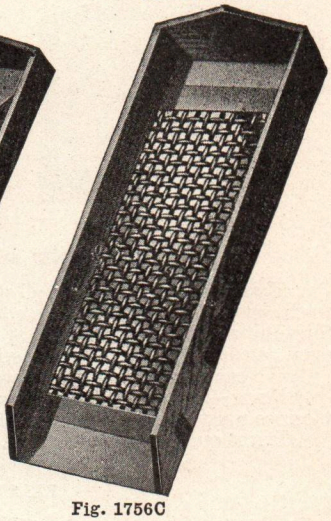


Fig. 1756C

SAND

Price, Coiled Wire, 5½ feet by 24 inches	per dozen	54.00
" Laced, Regular, 5½ feet by 24 inches	"	40.00
" " Large, 6 feet by 26½ inches	"	45.00
" Extra Heavy, 6 " " 26½ "	each	11.00

COAL

Price, No. 6, 5 feet by 30 inches	each	11.00
" " 7, 6 " " 36 "	"	13.50

RIDDLES

FOUNDRY

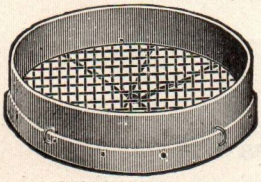


Fig. 1756D

COAL MINERS'

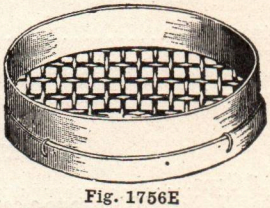


Fig. 1756E

FOUNDRY—18-INCH DIAMETER

Price, Heavy Steel Wire, Nos. 2 to 16	per dozen	.....
" Extra Heavy Steel Wire, Nos. 2 to 16	"	.....
" " " Galvanized Wire, Nos. 2 to 12	"	.....
" Heavy Brass Wire, Nos. 2 to 16	"	.....
" Extra Heavy Brass Wire, Nos. 2 to 16	"	.....

COAL MINERS'

Price, Extra Heavy Steel Wire, ¾, ⅞, 1, 1¼ or 1½ Mesh	per dozen	.....

These riddles are made of either woven or crimped wire, full size and extra heavy, for miners' use. They are also used by foundries for coke or other heavy work.

DYNAMITE, BLASTING ACCESSORIES, ETC.

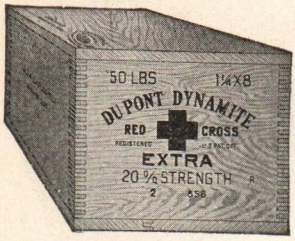


Fig. 14627A

DU PONT GELATIN

Du Pont Gelatin put up in 50-pound cases, all standard size cartridges. This is the most popular high explosive for all classes of mining. It is dense, plastic and waterproof. It gives off less objectionable fumes than any other high explosive and is low freezing. It is made in all strengths from 30 to 75 per cent. The strongest grades are used for tunneling in the hardest rock, and the 30 and 35 per cent for most metal mining operations.

DU PONT RED CROSS EXTRA DYNAMITE

This explosive is made in all strengths from 20 to 60 per cent strength, packed 50 pounds to the case in all standard size cartridges. It is the most popular explosive for quarry and for mining soft ore. Its fumes are not objectionable and it is low freezing. It is not, however, as suitable for wet work as Du Pont Gelatin.

We can furnish any of the standard brands of dynamite.

NOTE—Express companies will not receive explosives of any kind; therefore all explosives must be shipped by freight.

Prices quoted on application.

BLASTING CAPS

SAFETY FUSE

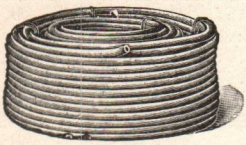


Fig. 14627B

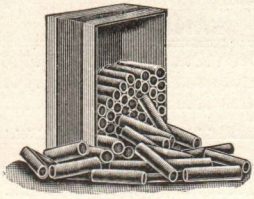


Fig. 14627C

ELECTRIC BLASTING CAP

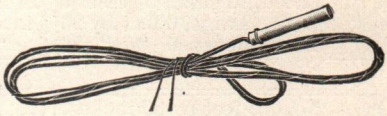


Fig. 14627D

SAFETY FUSE

Price, Cotton Fuse.....per thousand feet .....
" Crescent Fuse ..... " " .....
50 feet in a coil, 6000 feet in a barrel.
Prices quoted on application.

DETONATING CAPS

Price, No. 6 Caps.....per thousand .....
100 in a tin box, 10 boxes to a carton. Detonating caps cannot be packed and shipped with dynamite. Prices quoted on application.

ELECTRICAL BLASTING CAPS, DOUBLE INSULATION

Length of Wire.....feet	4	6	8	10	12	14	16
Price, No. 6.....per hundred	...	...	...	...	...	...	...
" " 8..... "	...	...	...	...	...	...	...
Length of Wire.....feet	18	20	22	24	26	28	30
Price No. 6.....per hundred	...	...	...	...	...	...	...
" " 8..... "	...	...	...	...	...	...	...

Prices quoted on application.

ATLAS BLASTING SUPPLIES

VICTOR ELECTRIC FUZES
Nos. 6 AND 8

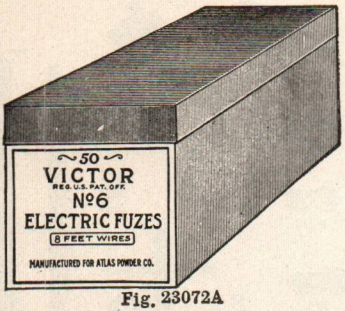


Fig. 23072A

Packed 25 and 50 in a carton, 10 cartons to the case. Insulated copper wires 4 to 30 feet.

BLASTING CAPS
Nos. 6 AND 8

Fig. 23072B

Packed 100 to the tin box, 5 to 50 boxes to the case. No blasting cap weaker than No. 6 can be depended on to develop the full strength of high explosives.

CLOVER FUSE

Fig. 23072C

Clover is for wet work. We are also prepared to furnish Beaver for dry work, Double Tape for wet work and Anchor for wet work. All wrapped in rolls of 100 feet. Ten to sixty rolls to the case.

BLASTING MACHINES

Fig. 23072D

U. S. STANDARD MACHINES

This is of the push-down type, substantially built, and can be depended upon to develop full capacity, if kept dry and operated with full force.

No. 2, capacity 10 copper wire electric fuzes.

No. 3, capacity 30 copper wire electric fuzes.

LITTLE GIANT MACHINES

For use where not more than 4 charges are required to be fired at one time. A strong machine, brass case, with removable handle. Capacity 4 copper wire fuzes.

Fig. 23072E

ATLAS CAP CRIMPERS

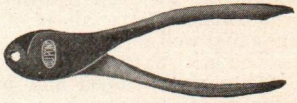


Fig. 23072F

Safe, secure and reliable way to attach a blasting cap to fuse is by use of this tool.

LEADING WIRE

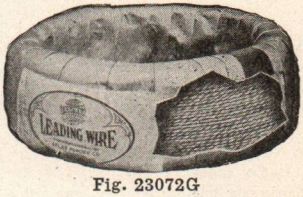


Fig. 23072G

For connecting electric fuzes to blasting machine. No.14 insulated wire in 200, 250, 300 and 350-foot coils. About 50 feet to the pound.

DUPLEX WIRE

Two No. 14 insulated wires bound together with an outside covering. Same length coils as single leading wire, about 25 feet to the pound.

Prices upon application.

HARDSOCG E. Z. Q. POST DRILLS

POST DRILL

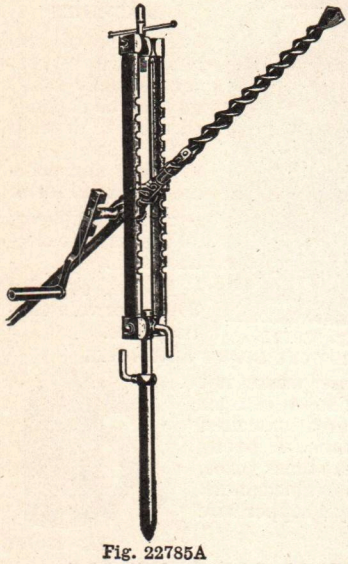


Fig. 22785A

PARTS

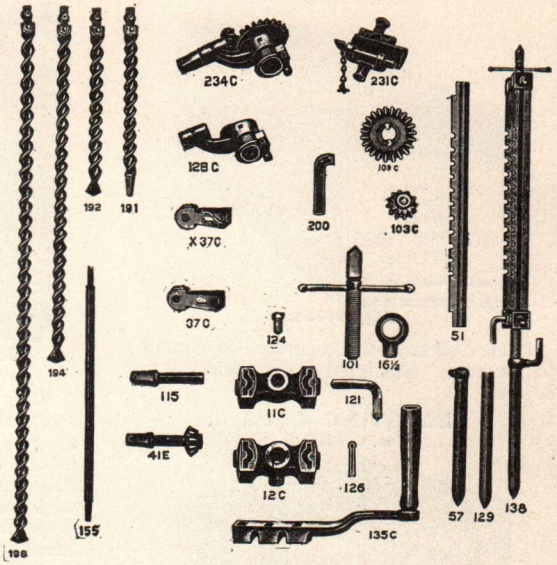


Fig. 22785B

Combines all the good features of the old Q machine with several important improvements, making it far ahead of other drills for hard service. Large gear wheel has double key and well formed teeth. The positive locking device prevents lost motion, and from the fact that the boxing fits inside the gear frame, it is impossible for it to spread. All parts machined and properly fitted together, insuring long wear. When the boxing wears out you have only a boxing to buy, not a complete gear frame as with other machines. Thread bar is reversible and if turned frequently both bar and boxing will wear longer. Furnished in 6 square and 8, 10, 12 and 14 Whitworth thread.

Unless otherwise specified, we always furnish this machine with Premier patented augers, and with thread bar and boxing having 8 threads to the inch.

PRICE LIST

E. Z. Q. Post Drill Complete	each	20.00
No. 11C, Post Casting for Jack Screw	"	1.25
" 12C, " " " Boot	"	1.25
" 16½, Ring for Boot	"	.30
" 37C, Socket for Auger, Plain	"	.40
" X37C, " " " Spiral	"	.40
" 41E, Journal and Small Wheel	"	1.25
" 51, Corrugated Side Bar for Post	per foot	.45
" 57, Boot, 1¼-inch	each	1.10
" 101, Jack Screw for Post	"	.85
" 103C, Small Gear Wheel	"	.60
" 109C, Large " "	"	.80
" 115, Journal only	"	.75
" 121, Tail Set Screw for No. 12C	"	.25
No. 124, Set Screw for Post Castings	each	.15
" 126, Spring Cotter	per dozen	.25
" 128C, Gear Frame	each	2.00
" 129, Stem for Post, 1¼-in.	"	1.00
" 135C, Crank	"	1.10
*" 138, Post Complete, 3-ft. and Under	"	7.00
" 155, Thread Bar	"	3.25
" 191, 2-ft. Extension Auger	"	1.25
" 192, 2 " Premier "	"	1.25
" 194, 4 " " "	"	2.50
" 196, 6 " " "	"	3.75
" 200, Key for Boxing with Chain	"	.25
" 231C, Boxing	"	1.25
" 234C, Side Gear	"	3.50

*Over 3-foot, add .35 for each ½ foot.

We can furnish these augers in 7 and 8-foot; also 2-inch regular feather edge, in all lengths.

HARDSOCG HEAVY COAL DRILLING MACHINES

END GEAR AND SIDE GEAR

Q AND Q E Z

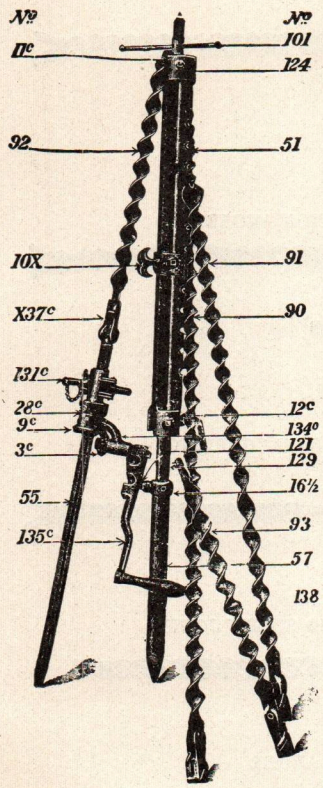


Fig. 25998A

Price, No. 54, Thread Bar for End Gear, not Slotted	each	2.25
" " 37B, Boxing for End Gear	"	1.00
" " 92, 2-foot Auger, 1½-inch F E	"	1.15
" " 91, 4 " " " " "	"	2.30
" " 90, 6 " " " " "	"	3.45
" " 90, 2 " " 1¾ " "	"	1.30
" " 90, 4 " " " " "	"	2.60
" " 90, 6 " " " " "	"	3.90
" " 135C, Cranks	"	.85
" " 11C, Casting for Jack Screw	"	1.00
" " 12C " " Stem	"	1.00
" " 101, Jack Screw	"	.65
" " 129, Stem 2 Feet Long, 1¼-inch Diameter	each	1.00
Price, No. 57, Boot 20-Inches Long	"	1.00
" " 121, Tail Screw	"	.20
" " 124, Set Screw	"	.15
" " 16½, Ring for Boot	"	.20
" " 37C, Socket for Augers	"	.50

Q SIDE GEAR PARTS

Price, No. 55, Thread Bar for Side Gear Slotted	each	2.50
" " 131C, Boxing for Side Gear	"	1.00
" " 134C, Gearing	"	3.20
" " 28C, Frame (Babbitted)	"	1.50
" " 9C, Large Cog (Machined)	"	1.00
" " 3C, Small "	"	.50
" " 115, Journal	"	.50

Q E Z SIDE GEAR PARTS

Price, No. 155, Thread Bar (Slotted)	each	2.50
" " 234C, Gearing	"	3.00
" " 231C, Boxing	"	1.00

Q AND Q E Z MACHINES COMPLETE WITH 1½-INCH FEATHER EDGE AUGERS

Number	1	2	3	3½	4
Price, End Gear with 2, 4 and 6-foot Augers..each	14.60	14.00	13.50	13.25	13.00
" " " " 2, and 4-foot " .. "	12.60	12.00	11.50	11.25	11.00
" Side Gear " 2, 4, and 6-foot " .. "	16.60	16.00	15.50	15.25	15.00
" " " " 2 and 4-foot " .. "	14.60	14.00	13.50	13.25	13.00
" Posts only "	8.00	7.20	6 40	6.00	5.60

For machines with 1⅝ or 1¾-inch augers, add to list with 2, 4 and 6 foot augers, 90 cents.

HARDSOCG BREAST AUGERS

No. 1 SOLID ONE-PIECE AUGER

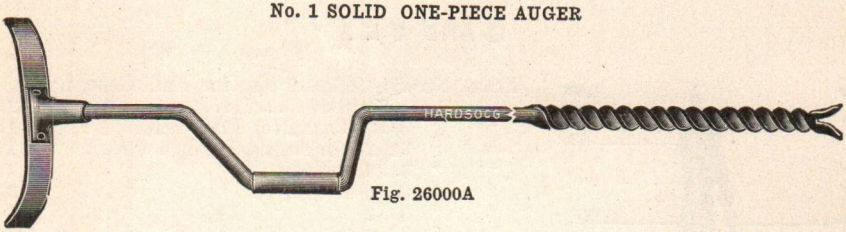


Fig. 26000A

No. 2 SQUARE SOCKET CONNECTION AUGER

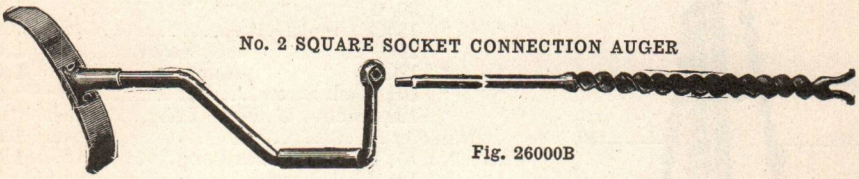


Fig. 26000B

COMMON CALIFORNIA OR UNION SCREW COUPLING

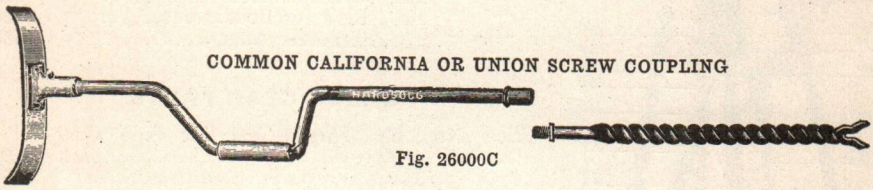


Fig. 26000C

WELDED EYE, ONE PIECE-DIRT AUGER, ALSO SCREW JOINT

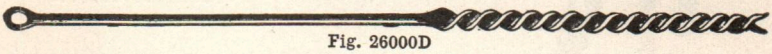


Fig. 26000D

No. 3 CRUCIBLE STEEL AUGER

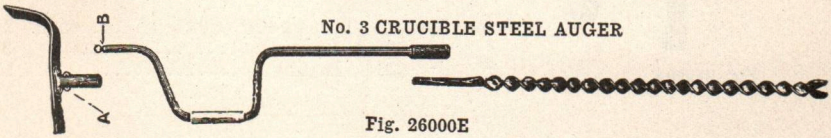


Fig. 26000E

The No. 3 crucible steel auger has the same patent breast plate and coupling as furnished on the No. 4.

GREAT No. 4 PATENT AUGER

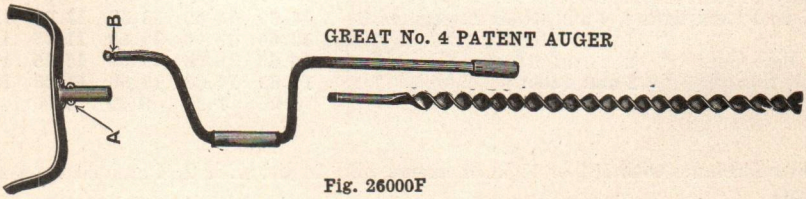


Fig. 26000F

MINERS TOOLS, ETC.

DRILLS—SINGLE BIT

Fig. 22957A

Iron tamp, 8½ inches, best cast tool steel on bit end, 1-inch round rod, 2½-inch bit.

Length.....feet	5	6	6½	7	7½	8	8½	9
Price.....per dozen	..	..	..	..	..	..	..	..

COPPER TIPPED TAMPING BARS

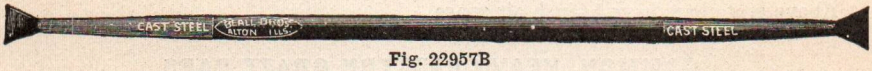


Fig. 22957B

No drill. To be used with double bit or machine drills. 1-inch round iron, 6 inches of copper on tamp end.

Length.....feet	6	7	8	9
Price.....per dozen	..	..	..	..

SCRAPERS—DOUBLE END

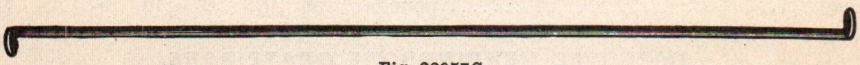


Fig. 22957C

Made of ⅜-inch round Norway iron.

Length.....feet	5	6	7	8
Price.....per dozen	..	..	..	..

STEEL NEEDLES—POLISHED

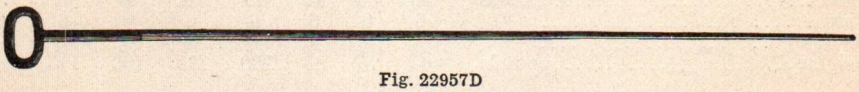


Fig. 22957D

Length.....feet	5	6	7	8
Price.....per dozen	..	..	..	..

ELECTRICAL FUSES—DOUBLE-WOUND INSULATION

Length of Wire.....feet	4	6	8	10	12	14	16
Price, Standard Strength...per hundred	....	....	....	....	....	....	....
" Double " .... "	....	....	....	....	....	....	....
Length of Wire.....feet	18	20	22	24	26	28	30
Price, Standard Strength..per hundred	....	....	....	....	....	....	....
" Double " .. "	....	....	....	....	....	....	....

E. S. CO. WATERPROOF BLASTING PAPER

A high-grade paper in every respect for shooting in coal mines. Stock width, 12 inches. 5-pound rolls, 5 rolls to a bundle. We can also furnish this in 1, 2, 3 and 4-pound rolls. We can furnish different widths.

Prices upon application.

GRATE BARS

COMMON, LIGHT PATTERN GRATE BARS

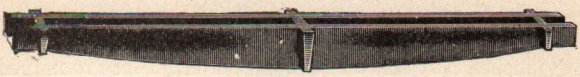


Fig. 17515A

Length	inches	24	26	27	28	30	33	36
Width	"	2¾	2¾	2¾	2¾	2¾	2¾	3
Weight	pounds	16	17	17	23	24	34	36

Above grate bars have ½-inch air space.

COMMON, HEAVY PATTERN GRATE BARS

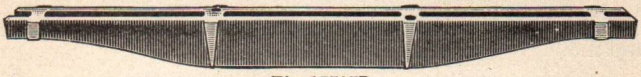


Fig. 17515B

Length	inches	42	48	50	54	60	66	72
Width	"	3	3	3	3	3	3	3
Air Space	"	⅝	⅝	⅝	⅝	⅝	⅝	⅝
Weight	pounds	56	60	60	70	90	105	115

IMPROVED HERRINGBONE GRATE BARS

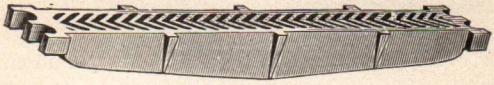


Fig. 17515C

Length	inches	33	36	42	48	54	60	66	72
Width	"	6	6	6	6	6	6	6	6
Air Space	"	½	½	½	½	½	½	½	⅝
Weight	pounds	65	75	85	100	115	130	145	160

ROUND GRATE BARS

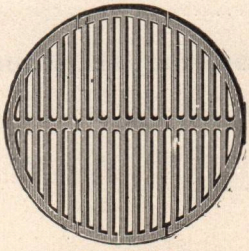


Fig. 17515D

Diameter	inches	16	18	20	22	24	25	26	27	28
Weight	pounds	45	50	75	85	97	100	120	122	125
Diameter	inches	29	30	32	33	34	35	36	40	42
Weight	pounds	145	150	175	180	185	210	220	385	400

HANDY FIRING TOOLS

FIRE HOE

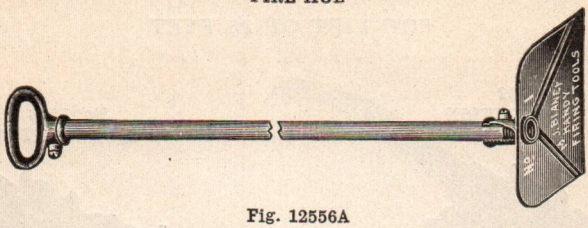


Fig. 12556A

FIRE HOOK

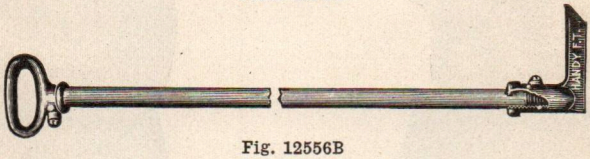


Fig. 12556B

CLAW HOOK

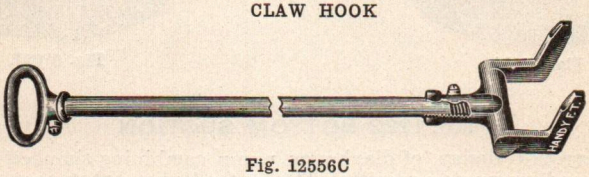


Fig. 12556C

TEE BAR

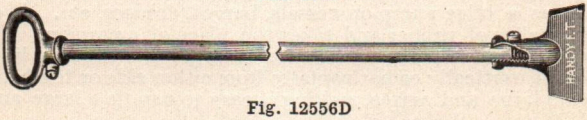


Fig. 12556D

SLICE BAR

Fig. 12556E

The fire hoe is made in sizes, 6x9, 6x11 and 6x13 inches. The claw hook is made in two or three-prong. The fire claw is a necessary tool, especially where mine run coal is burning, for cutting the top and allowing the gases to escape and forking out clinkers.

The tee bar gives the grate a double cleaning and saves time and prevents cold air from entering furance to a great extent.

Description	Size Inches	Size Pipe for Handle, Inches	Weight Pounds	Price, Each With Grip	Price, Each Without Grip
Fire Hoe	6x13	1	8	**3.05**	**2.85**
" Hook	6	1	4	**3.05**	**2.85**
Claw Hook, 3-P.	6x5½, 6x4½	1	5	**3.30**	**3.10**
Tee Bar	6x7½	1	5	**3.05**	**2.85**
Slice Bar	18½ and 23½x3½	1	8 and 10½	**3.05**	**2.85**

Any three tools in one order for 8.50.

GOULDS
DIAPHRAGM SUCTION PUMPS

FOR LIFT OF 25 FEET

No. 1222
BOTTOM SUCTION

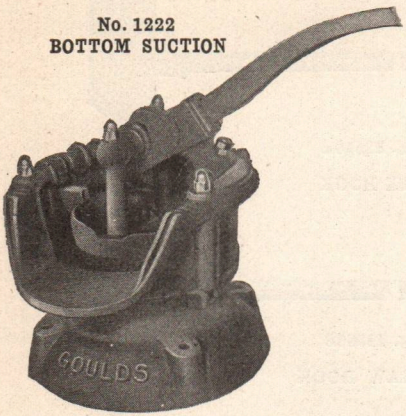


Fig. 9702A

No. 1223
SIDE SUCTION

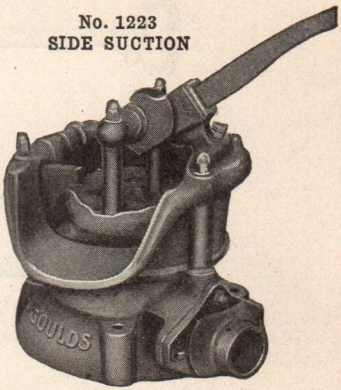


Fig. 9702B

No. 1222 BOTTOM SUCTION

An approved design of diaphragm pump combining simplicity and strength; valuable for handling muddy or gritty water, as the foreign substances in the water does not injure the pump. They are used for pumping out excavations, cellars, trenches, quarries, etc., and as a bilge pump on vessels, barges, dredges, etc. The diaphragm is made of a good quality of rubber and takes the place of a plunger. The lower valve is metal, rubber-faced, and is easily removable. The lever is wrought iron and is reversible so it can be used vertically or horizontally from either side or the back of the pump. The waterways are large and ample, making it easy to handle a large amount of water.

Number	2	3	4
Pipe Connections Iron Pipe and Hose ..... inches	2½	3	4
Approximate Capacity per Hour ..... gallons	1800	3500	6000
Price, Pump only ..... each	20.60	26.85	45.60

No. 1223 SIDE SUCTION

The above pumps are similar in construction to the bottom suction style, but fitted with a side suction and a rubber-faced suction valve resting on an inclined seat, which offers the least obstruction to the passage of any matter.

Number	2	3	4
Pipe Connections Iron Pipe and Hose ..... inches	2½	3	4
Approximate Capacity per Hour ..... gallons	1800	3500	6000
Price, Pump only ..... each	23.75	30.60	50.00

Unless otherwise ordered, suction is cut-pipe thread, which is the thread generally used for hose couplings. We can cut to any special hose gauge, if ordered. Suction hose, couplings and strainers furnished at extra price.

CHALLENGE DOUBLE-ACTING FORCE PUMPS

No. 470

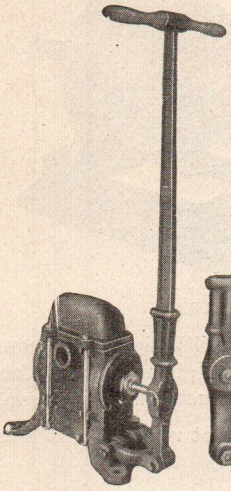
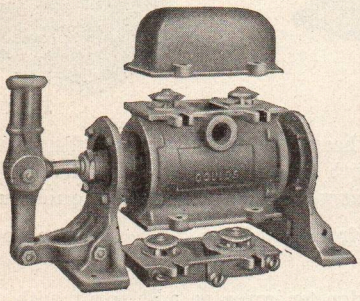


Fig. 6594A

SHOWING UPPER AND LOWER VALVES



No. 562

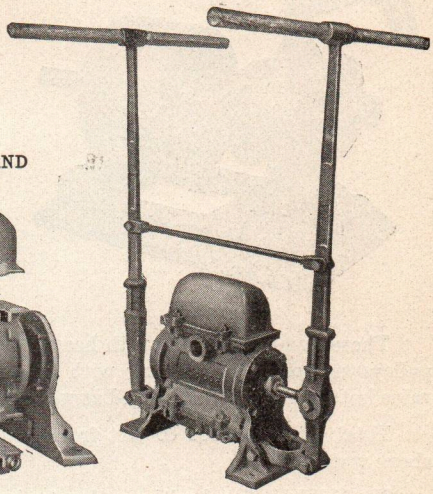


Fig. 6594B

The "Challenge" Double-Acting Force Pumps illustrated herewith are adapted for a large variety of purposes, in factories, on wharves, aboard ships as deck pumps, and for domestic and fire purposes; in addition they offer a most convenient and effective means for raising and distributing water to upper floors and attic tanks for gravity supply. Fitted with single or double levers for hand power.

Suction and discharge are regularly fitted for iron pipe. Fitted for hose at extra price.

No. 470

No.	Diam. of Cylinder Inches	Stroke Inches	Capacity per Revolution Gallons	Pipe Connections Inches		*Lift and Force Feet	Price, Each		
				Suction	Discharge		Brass-lined Cylinder	Brass Cylinder	†Brass
2	2½	4½	.19	1½	1½	150	30.00	82.00	112.00
4	3	4½	.28	1½	1½	150	31.00	82.00	112.00
8	4	4½	.49	2	2	100	34.00	90.00	135.00
12	5	5¼	.89	2½	2½	100	45.00	135.00	225.00
16	6	5¼	1.28	2½	2½	100	56.00	180.00	275.00

No. 562

8	4	4½	.49	1½	1½	125	40.00	100.00	150.00
12	5	5¼	.89	2	2	125	50.00	145.00	230.00
16	6	5¼	1.28	2½	2½	125	60.00	190.00	290.00

*Total lift and force from supply to point of delivery, pump not more than 25 feet above water. †Brass pumps are made entirely of brass, except levers, links and bolts.

GOULDS ROTARY FORCE PUMPS

LIFT AND FORCE 60 FEET

No. 1185½

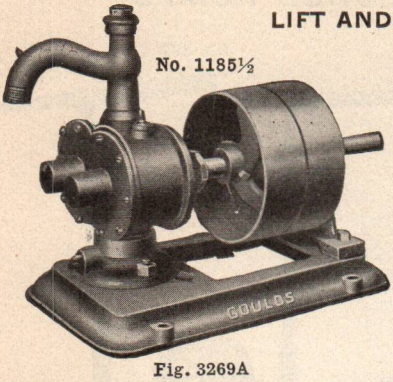


Fig. 3269A

No. 1281

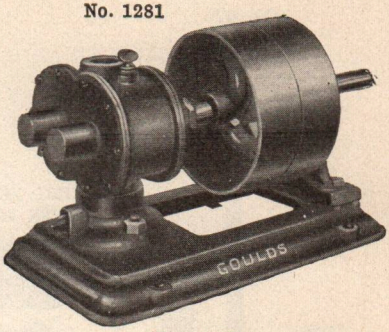


Fig. 3269B

These pumps are made with heavy cast iron base and fitted with tight and loose pulleys supported by bearing with babbitted boxes. By the use of metallic suction valve hot liquids can be pumped as well as cold, but the hot liquid must flow to the pump.

Total lift and force 60 feet from supply to delivery, pump not more than 15 feet above water.

No. 1185½ is fitted with suction for iron pipe and spout with top discharge. No. 1281 is the same as No. 1185½, but without spout piece.

No.	Capacity per Min. 200 Revs. Gallons	Suction Pipe Inches	Discharge Inches		Tight and Loose Pulleys Inches	Price, Each					
						No. 1185½			No. 1281		
			No. 1185½ Hose	No. 1281 Pipe		Iron	Bronze Case and Cams	*Bronze	Iron	Bronze Case and Cams	*Bronze
1	20	1¼	1	1¼	8x2½	19.75	66.15	81.00	19.00	64.80	78.30
2	25	1¼	1	1¼	8x2½	22.00	75.60	87.75	21.25	74.25	85.00
3	28	1½	1¼	1½	8x2½	23.25	85.00	101.25	22.35	83.70	98.55
4	50	2	1½	2	12x3½	44.50	114.00	146.25	43.00	111.15	140.40
4A	50	2	1½	2	16x3½	50.30	122.85	160.85	49.10	120.00	155.00
5	55	2	2	2	12x3½	47.80	131.60	175.50	46.00	128.70	169.65
5A	55	2	2	2	16x3½	53.85	140.40	190.00	52.25	137.50	184.25
6	65	2½	2½	2½	24x4	80.00	197.45	255.95	77.50	193.75	248.60

*Bronze pumps have all parts of pump coming in contact with liquids, made of bronze.

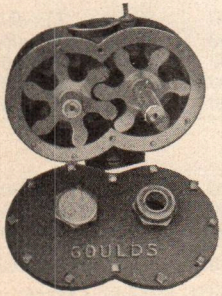


Fig. 3269C

Herewith is a sectional view showing case and cams of Goulds Rotary Pump.

The rotary pump must be made with the utmost care and accuracy, or it is worthless—and it is in these points of excellence accomplished by skilled labor and improved machinery, that we have earned the enviable reputation for the Goulds Rotary.

We earnestly recommend users to run a small quantity of oil through the working parts of rotary pumps before and after using to prevent rusting. Drip plugs are provided for draining the pump in cold weather.

GOULDS CENTRIFUGAL PUMPS

STANDARD SIDE SUCTION

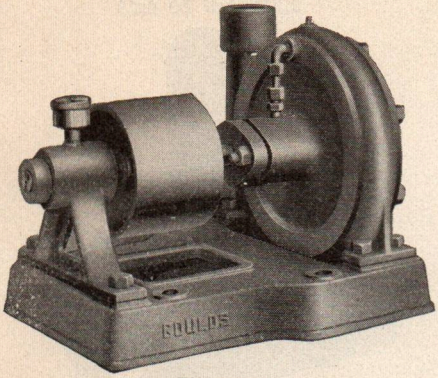


Fig. 5598A

VERTICAL SUBMERGED WITH FEET

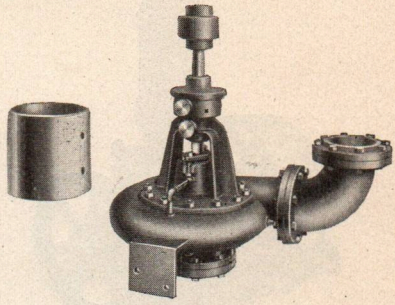


Fig. 5598B

STANDARD SIDE SUCTION

The pump is designed so that the total head pumped against, and the quantity of fluid handled, can be varied without affecting the mechanical efficiency. This pump is also furnished for direct connection to electric motors, steam engines, steam or hydraulic turbines, etc.

No.	Pipe Connections Inches Suction	Discharge	Capacity per Minute Gallons	Size of Pulley Inches	Floor Space Required Inches	Shipping Weight Pounds	Price, Each Iron	Brass Fitted	Brass	Primers
1	1½	1	30	4x 3	11¼x 9½	35	**13.60**	**25.00**	**60.00**	....
1½	2	1½	70	5x 5	19½x12¾	100	**23.00**	**36.00**	**115.00**	**8.60**
2	3	2	120	6x 6	22¼x16	200	**38.00**	**60.00**	**200.00**	**11.40**
2½	3	2½	200	6x 7	24¾x19	265	**45.00**	**72.00**	**235.00**	**11.40**
3	4	3	270	7x 7	26½x22	375	**63.00**	**88.00**	**280.00**	**14.30**
4	5	4	470	10x10	33¼x29¼	650	**80.00**	**130.00**	**500.00**	**17.25**
5	6	5	750	12x12	37¾x33	850	**115.00**	**180.00**	**830.00**	**20.00**
6	8	6	1050	14x14	42¾x37¼	1200	**160.00**	**210.00**	**1170.00**	**26.00**
8	10	8	2000	16x14	48 x47	1850	**220.00**	**475.00**	.....	.....
10	12	10	3000	18x16	53 x53	2600	**285.00**	**645.00**	.....	.....
12	15	12	4200	20x18	58 x59	3200	**405.00**	**930.00**	.....	.....

VERTICAL SUBMERGED

No.	Pipe Connections Inches Suction	Discharge	Capacity per Minute Gallons	Size of Pulley Inches	Shipping Weight Pounds	Diam. of Line Shaft Inches	Price Each
4	4	4	470	7x 7	275	1 5/16	**112.00**
5	5	5	750	10x10	425	1 9/16	**140.00**
6	6	6	1050	12x12	650	1 11/16	**167.00**
8	8	8	2000	14x14	950	1 15/16	**210.00**
10	10	10	3000	16x14	1400	2 7/16	**265.00**

Prices and weights include complete all iron pumps having a short shaft extension, strainer, discharge elbow, one flanged coupling, standard pulley and thrust-bearing housing, but neither line shafting nor vertical bearings.

GOULDS PYRAMID DOUBLE-ACTING PUMPS

FOR GENERAL WATER SUPPLY

Patented October 1, 1912

No. 1531

SIZE 2½x4

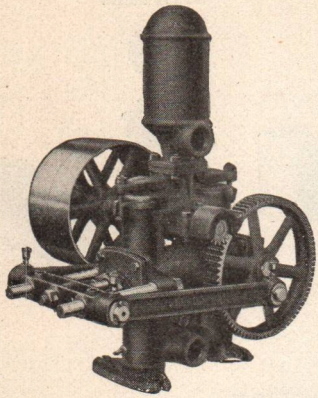


Fig. 4077A

SIZES 3x5 TO 6x12

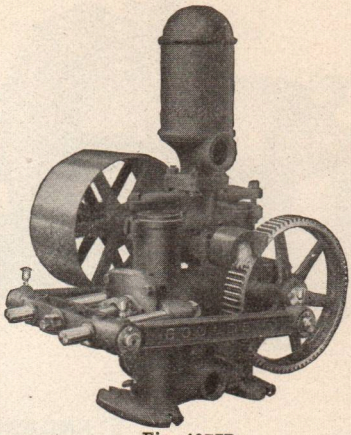


Fig. 4077B

The cylinder is brass-lined, gears are machine cut, valves are rubber, disc and valve seats are brass.

Pistons Diam. Inches	Pistons Stroke Inches	Displacement Rev. Crank Shaft Gallons	Usual Speed and Displacement per Minute Rev.	Usual Speed and Displacement per Minute Gallons	For Elevation in Feet	Horse Power at Cat. Rating	Size Pipe Inches Suction	Size Pipe Inches Discharge	Geared	Tight and Loose Pulleys Inches	Weight Pounds	Price Each	Add For Form C Drive* Weight Pounds	Add For Form C Drive* Price Each
2½	4	.162	38	6	175	½	1¼	1¼	5 to 1	8x2½	160	**60.00**	160	**45.00**
3	5	.293	41	12	175	1	1½	1½	5 " 1	15x2½	280	**82.50**	160	**70.00**
4	5	.531	40	21	175	1½	2	2	5 " 1	15x3	325	**97.50**	170	**80.00**
5	5	.823	40	33	175	3	2½	2½	5 " 1	16x4	500	**127.50**	220	**95.00**
6	6	1.440	40	57	175	5	3	3	5 " 1	20x4	645	**150.00**	300	**110.00**
6	12	2.870	40	114	175	7½	4	4	6 " 1	26x4	875	**225.00**	350	**130.00**

*Includes bed plate, gear and pinion for direct connection to motor. Motor not included.

The ratings in the above table are based on the assumption that cold water is the liquid pumped.

Air valve furnished with any of the above pumps when desired for use with pneumatic tank water supply systems, at extra price of 2.50.

No. 1678

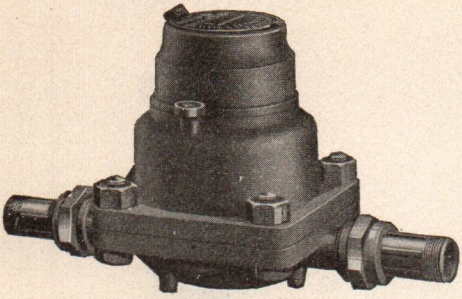
This pump same style as No. 1531 only it is recommended for 200-foot elevation.

Pistons Diam. Inches	Pistons Stroke Inches	Displacement Rev. of Crank Shaft Gallons	Usual Speed and Displacement per Minute Rev.	Usual Speed and Displacement per Minute Gals.	Horse Power at Cat. Rating	For Elevation in Feet	Size Pipe Inches Suction	Size Pipe Inches Discharge	Geared	Tight and Loose Pulleys Inches	Weight Pounds	Price Each	Add For Form C Drive* Weight Pounds	Add For Form C Drive* Price Each
2¼	4	.13	39	5	½	200	1¼	1¼	5 to 1	8x2½	170	**75.00**	160	**45.00**
2¾	5	.245	41	10	1	200	1½	1½	5 " 1	15x2½	295	**100.00**	160	**70.00**
3¾	5	.465	39	18	1½	200	2	2	5 " 1	15x3	340	**120.00**	170	**80.00**
4¾	5	.741	38	28	3	200	2½	2½	5 " 1	16x4	525	**155.00**	220	**95.00**
5¾	6	1.316	38	50	5	200	3	3	5 " 1	20x4	680	**180.00**	300	**110.00**

*Includes bed plate, gear and pinion for direct connection to motor. Motor not included.

NIAGARA WATER METERS

(PATENTED)



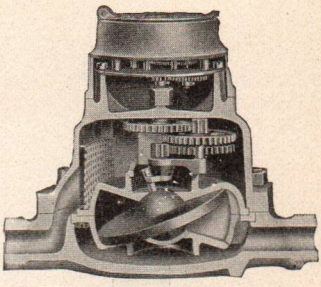


Fig. 10624A

The new Niagara Meter has the outer casing made of a fine grade of cast iron, carefully galvanized, and warranted for a working pressure of 150 pounds per square inch. When a meter is frozen, one half of the outer case usually breaks, thus relieving the inner and more expensive parts from injurious strain.

The works are carefully made on the interchangeable plan, from bronze composition, hard brass, hard rubber and nickel silver; they are protected by an internal strainer.

The measuring chamber is of large capacity, and is fitted with an extra thick, reenforced measuring disc.

The intermediate gears revolve on protected pivot bearings which reduce friction and wear, and prevent dirt from entering the gear bearings.

The flow of water through the meter is downward, which tends to flush out all sediment and sand, and thus keeps the meter in an operative and sanitary condition.

All sizes may be regulated for unusual pressures by slightly rotating the measuring chamber upon its seat and thus covering more or less of the outlet in the meter base.

The Niagara Meter contains only seven submerged working parts and is wonderfully simple and accessible for inspection and repair. It may have either a round reading or a straight reading register, indicating cubic feet or gallons, at buyer's option.

All sizes and styles from ⅝ to 2½ inches, inclusive, are made with male spuds to receive brass union couplings.

Meters can also be supplied with all bronze and part bronze cases, and for measuring gasoline, fuel oil, etc.

Size.....inches	⅝x½	⅝x¾	¾	1	1¼
Greatest Proper Capacity per Minute..gallons	20	20	34	53	75
Iron Pipe Size of Coupling.....inches	½	¾	¾	1	1¼
Height..... "	6½	6½	6¾	7½	8¾
Width..... "	6	6	7	8	9¼
Length, Meter only..... "	7½	7½	9	10¾	11¼
" Including Couplings..... "	12½	12½	14	16	16¾
Weight, Boxed.....pounds	14	14	20	28	40
Price.....each	**16.00**	**16.00**	**24.00**	**35.20**	**48.00**
" Brass Couplings.....per set	**1.00**	**1.50**	**1.50**	**2.00**	**3.00**
Size.....inches	1½	2	2½	3	....
Greatest Proper Capacity per Minute..gallons	100	160	240	315	....
Iron Pipe Size of Coupling.....inches	1½	2	2½	3	....
Height..... "	10¼	11	12½	13½	....
Width..... "	10¼	12¾	15	15	....
Length, Meter only..... "	12⅝	15½	18¼	23	....
" Including Couplings..... "	18½	21¼	24½	....	....
Weight, Boxed.....pounds	60	100	150	200	....
Price.....each	**64.00**	**96.00**	**140.00**	**192.00**	....
" Brass Couplings.....per set	**4.00**	**6.00**	**8.00**	....	....

Five eighths inch meters furnished for either ½ or ¾-inch pipe.

FIRE HYDRANTS

ECLIPSE ANTI-FREEZING

No. 3

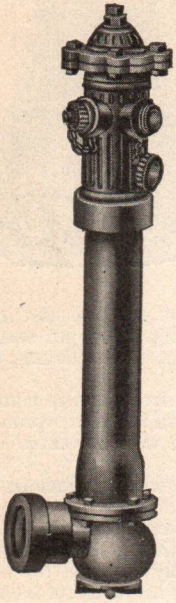


Fig. 6723A

STANDARD HYDRANT

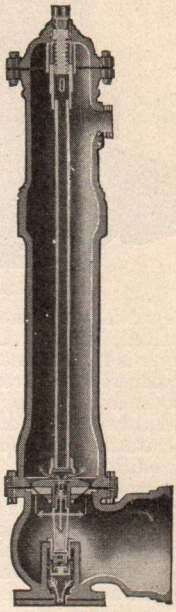


Fig. 6723B

Diam. of Inlet Pipe Inches	Pavement to Center of Inlet Feet	One 2½-in. Hose Nozzle	Two 2½-in. Hose Nozzles	Three 2½-in. Hose Nozzles	One Steamer Nozzle	One Steamer and One 2½-inch Nozzle	One Steamer and Two 2½-in. Nozzles	Frost Case Standard Length	Each Ft. in Length of Standpipe Extra	Each Ft. in Length of Frost Case Extra
No. 3										
3	5	32.00	34.00	36.00	34.00	36.00	38.00	7.00	1.50	1.00
4	5	32.00	34.00	36.00	34.00	36.00	38.00	7.00	1.50	1.00
5	5	34.00	36.00	38.00	36.00	38.00	40.00	7.00	1.50	1.00
6	5	34.00	36.00	38.00	36.00	38.00	40.00	7.00	1.50	1.00
No. 6										
6	5	47.00	49.00	51.00	49.00	51.00	53.00	10.00	2.25	2.00
No. 10										
6	5	47.00	49.00	51.00	49.00	51.00	53.00	10.00	2.25	2.00

Nos. 6 and 10 hydrants are same as No. 3, except having a larger valve opening and standpipe.

In ordering, always give following information, viz.—

Whether wrought iron pipe thread, flange, bell or spigot connection. Size of bottom connection. Length from pavement to center of inlet. Size and form of nut to open hydrant. Whether to turn to right or left to open. Number and size of nozzles. Send hydrant cap or hose coupling for gauge of thread.

Unless otherwise ordered, hydrant thread will be made to open by turning to the left. Frost cases furnished if desired.

VALVE BOXES

VALVE BOX

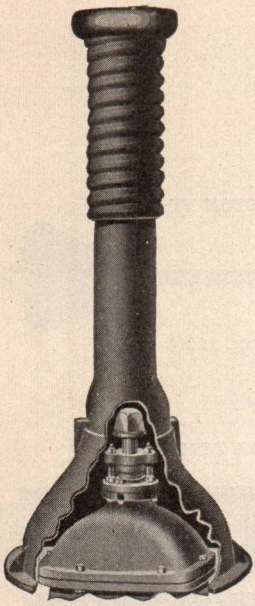


Fig. 4340A

SQUARE HEAD FOR VALVE BOX

Fig. 4340B

EXTENSION SECTION

Fig. 4340C

REGULAR COVERS

Fig. 4340D

Fig. 4340E

FLANGED COVER

Fig. 4340F

LOCK COVER

Fig. 4340G

VALVE BOXES, 5¼-INCH SHAFT, No. 6 BASE

Number	AAA	AA	A	B	C
Extension ... inches	17	22–28	28–40	36–48	42–54
Price ... each	**4.60**	**5.55**	**5.80**	**6.30**	**6.55**
Number	CC	D	E	F	G
Extension ... inches	48–60	42–66	60–72	60–84	72–84
Price ... each	**6.90**	**7.30**	**7.90**	**8.40**	**9.10**

Square head valve boxes, same price as above.

EXTENSION SECTIONS

Number	58
Increasing Length of Box ... inches	14
Price (Size, 5¼ Inches) ... each	**1.35**

BASES FOR VALVE BOXES

Style of Base...	No. 4, Round for 4-inch Valves	No. 6, Round for 6 and 8-inch Valves	No. 8, Round for 10-inch Round Valves	No. 16, Round for 12 and 16-inch Round Valves	No. 160, Oval for 10, 12 and 16-inch Oval Valves	No. 162, Oval for 18 and 20-inch Oval Valves
	Deduct from Net Price of Box	Included in Net Price of Box	Add to Net Price of Box	Add to Net Price of Box	Add to Net Price of Box	Add to Net Price of Box
Price, each	**.25**	.....	**.50**	**3.50**	**.50**	**3.00**

COVERS FOR VALVE BOXES

Price, Regular and Flanged ... each	**2.00**
" Lock ... "	**2.50**

TANK HOOPS AND HOOP FASTENERS OR LUGS

CALDWELL PATENT FLAT HOOP LUG

TOP VIEW

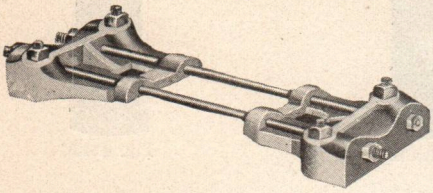


Fig. 1969A

BOTTOM VIEW

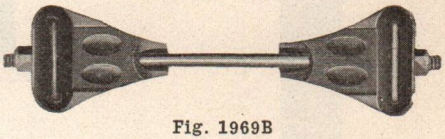


Fig. 1969B

The 3½-inch and larger sizes have two bolts.

TECKTONIUS FLAT HOOP FRICTION LUG

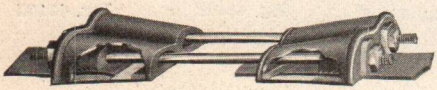


Fig. 1969C

CALDWELL RIVETED LUG

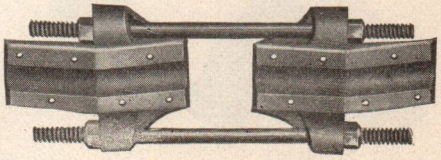


Fig. 1969D

Tecktonius Lugs 4-inch and larger sizes have two bolts. Caldwell Riveted Lugs of all sizes have two bolts.

Size .....inches	1½	2	2½	3	3½	4	5	6
Price.....per pair	.72	1.08	1.44	1.80	2.70	3.60	5.40	6.30

MALLEABLE IRON ROUND LUG

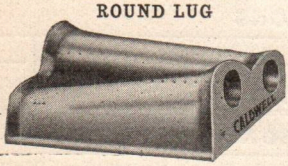


Fig. 1969E

TANK HOOPS

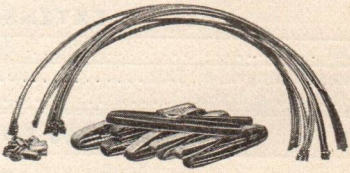


Fig. 1969F

MALLEABLE IRON ROUND LUGS

Size.....inches	½	⅝	¾	⅞	1	1⅛
Price .....each	.36	.48	.60	.72	.96	1.20

TANK HOOPS

Prices on application. We can also quote you on tank covers, valves, cleanouts, etc.

PORTABLE FLOOR CRANES AND HOISTS

"THE HANDIEST TOOL IN THE SHOP"

IN OPERATION

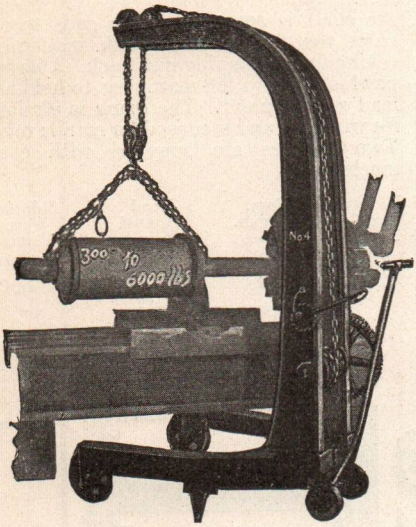


Fig. 6630A

IN OPERATION
LIFTING STEAM PUMP

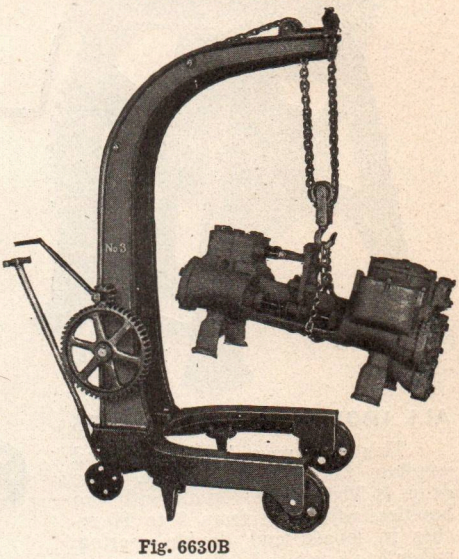


Fig. 6630B

"The Handiest Tool in the Shop" speaks for itself. Few shops can afford to be without it. Save useless expenditures by getting one quickly.

It easily goes into every nook and crook of a factory, often lifting and conveying heavy pieces in limited space where there is not room for more than one man. Stiffest possible construction, a combination of cast iron and steel. Has roller-bearing wheels and guaranteed tested chain.

It is easily operated and can be moved to any part of the shop by one man. It's a one-man machine capable of doing more work in less time, than six men can do without it. Many users claim it saves its cost in a few months. The Nos. 2, 3 and 4 are the sizes most useful for average shops.

Select the size by dimensions. Lifting capacity has nothing to do with the selection.

Number	1	2	3	4	5	6	7	8
Total Height ..... feet	5⅔	6½	7½	8½	9½	10½	11½	12½
Lift ..... "	4½	5⅓	6⅓	7⅓	8¼	9¼	10¼	11¼
Overhang ..... "	2¼	2½	2¾	3	3¼	3½	3¾	4
Width of Bed Outside ..... inches	29	32	34	40	44	48	53	58½
" " " Inside ..... "	22	25	28	32	36	40	44	49½
Length of Bed ..... "	35	38	45	48	51	54	57	61
Height " " ..... "	9	12	12	12	12	12	12	12
Capacity ..... pounds	2000	4000	5000	6000	6500	7000	7000	7000
Weight ..... "	600	740	890	1150	1300	1550	1800	2000
Price ..... each	100.00	112.50	125.00	150.00	162.50	175.00	187.50	200.00

Nos. 2, 3, 4 and 5 hoists furnished with low beds 6¾ inches high at same price. When ordering, state whether high or low bed is wanted.

WINCHES AND WINDLASSES

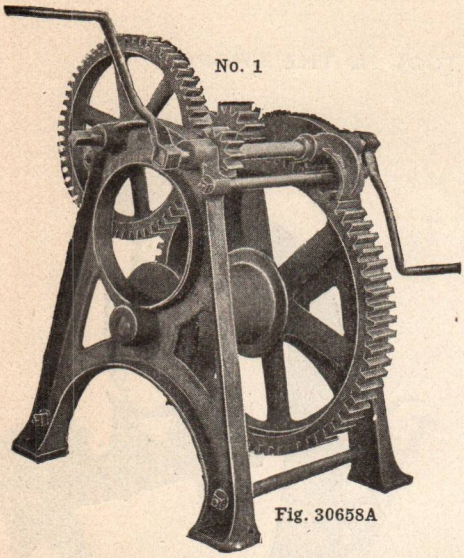


Fig. 30658A

HAND WINCHES

Our hand winches are self-contained and are very simple and powerful. They are capable of standing all the strain which can be applied by hand. The intermediate shaft is squared at the ends to receive the handles for quick motion in taking up and paying out slack. A heavy pawl is fitted to the main gear to hold the load at any point. The drum is straight for wire rope and is curved for manila rope. Two handles are supplied with each machine.

Size No.	Diam. of Drum Inches	Load Hoisted Pounds	Shipping Weight Pounds
1	12	10000	1100
2	9	5000	600

Prices upon application.

ALL IRON HAND WINDLASSES

This is a special all iron hand windlass for prospecting, etc. The drum is 30x8 inches. Made with two handles, adjustable from 6 to 17 inches in length and double gearing, either 2 to 1 or 5 to 1. Gearing may be changed instantly. Equipped with safety catch for holding load at any point and with band brake for lowering. May be used directly over the shaft or with tripod. Weight, 200 pounds.

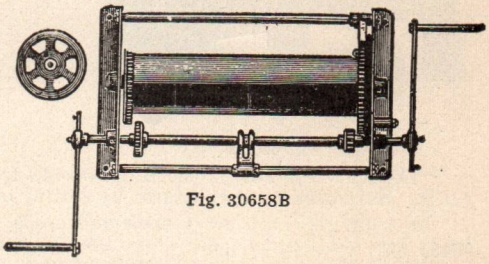


Fig. 30658B

IRONS FOR PROSPECTORS' WINDLASSES

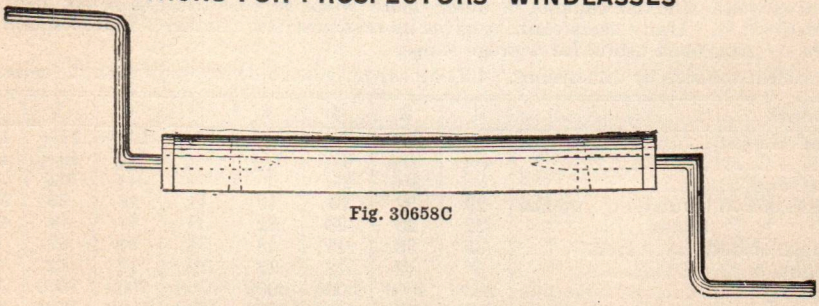


Fig. 30658C

These irons consist of two handles of ¾-inch round iron with square shanks where driven in the wood, provided with keys for locking in place, also two rings for ends of wooden drum.

WINDLASSES

SINGLE GEARED

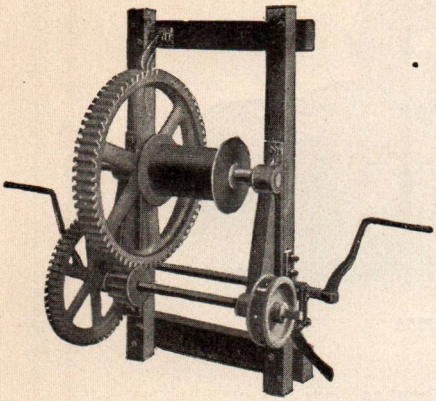


Fig. 30657A

No. 6, DOUBLE GEARED

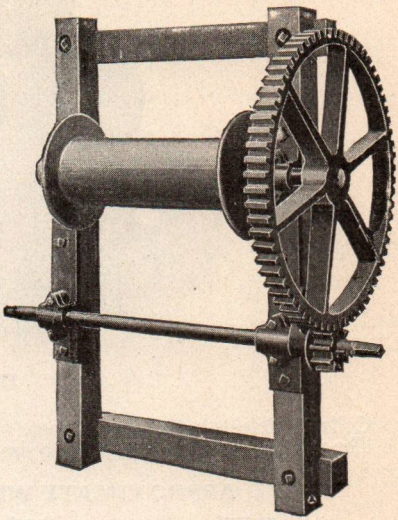


Fig. 30657B

We can furnish windlasses for use on derricks and similar work in several types, two of which are shown in the above illustrations. These two types are used when the boom fall is fitted for manila rope, the hoist rope only being handled by the windlass. When wire rope is used for both boom and hoist, we furnish windlasses with two drums, each arranged to operate independent of the other, but driven from one crankshaft. All drum gears are fitted with pawls to hold the load at any point. The bearings are cast in a sole plate, which prevents any spreading of the boxes and slipping of gear teeth. The standard machine is fitted with wood frame, but iron or steel frames can be supplied at an extra cost.

PRICES FOR SINGLE-GEARED WINDLASSES

				Single Drum		Double Drum	
No.	Diam. of Drum Inches	Length of Drum Inches	Proportion of Gearing	Shipping Weight Pounds	Price Each	Shipping Weight Pounds	Price Each
1	5	15	1 to 4	230	**50.00**	375	.....
2	7	21	1 " 5	375	**55.00**	650	.....
3	9	36	1 " 7	900	**80.00**	1575	.....

ROPE

COLUMBIAN LONG FIBER MANILA ROPE

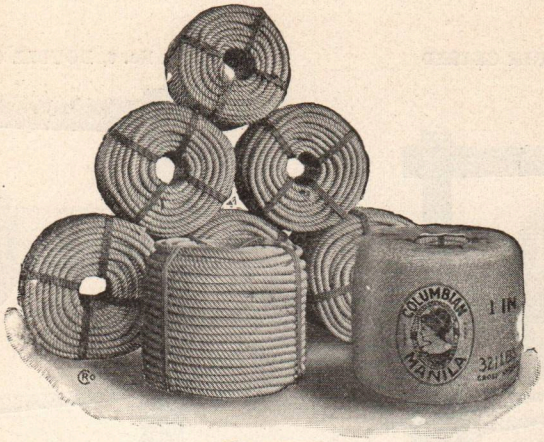


Fig. 21725A

Coils, 1200 feet; half coils, 600 feet.
The relative strength of Manila to sisal is about as 7 is to 5.

APPROXIMATE WEIGHT AND STRENGTH

Diam. Inches	Circumference Inches	Length of Manila in 1 Lb. Ft.	In.	Full Coils Length Feet	Wt. Lbs.	Strength of New Manila Rope, Lbs.	Diam. Inches	Circumference Inches	Length of Manila in 1 Lb. Ft.	In.	Full Coils Length Feet	Weight Pounds	Strength of New Manila Rope, Lbs.
3/16	1/2	60	..	2100	35	550	1 1/8	3 1/2	2	9	1200	432	10500
1/4	3/4	55	..	2750	50	620	1 1/4	3 3/4	2	5	1200	504	12500
5/16	1	41	..	2250	55	1000	1 5/16	4	2	1	1200	576	14000
3/8	1 1/8	27	..	1620	60	1275	1 3/8	4 1/4	1	10	1200	648	15400
7/16	1 1/4	18	..	1260	70	1875	1 1/2	4 1/2	1	8	1200	720	17000
1/2	1 1/2	13	4	1200	90	2400	1 9/16	4 3/4	1	6	1200	810	18400
9/16	1 3/4	9	7	1200	125	3300	1 5/8	5	1	4	1200	900	20000
5/8	2	7	6	1200	160	4000	1 3/4	5 1/2	1	1	1200	1080	25000
3/4	2 1/4	6	1	1200	198	4700	2	6	..	11	1200	1296	30000
13/16	2 1/2	5	1	1200	234	5600	2 1/8	6 1/2	..	9 1/2	1200	1512	33000
7/8	2 3/4	4	5	1200	270	6500	2 1/4	7	..	8	1200	1764	37000
1	3	3	8	1200	324	7500	2 1/2	7 1/2	..	7	1200	2016	43000
1 1/16	3 1/4	3	2	1200	378	8900	2 5/8	8		6 1/4	1200	2304	50000

CORDAGE BASIS

The basis size of rope is 3-strand rope 3/4 inch in diameter (2 1/4 inches in circumference) and larger. Rope of the smaller sizes take the advances below. There is a basis price for each grade of Manila and each grade of sisal.

Diam. Inches	Circumference Inches	Thread	Price Above Basis	Diam. Inches	Circumference Inches	Thread	Price Above Basis
5/8	2	33 & 36	**.005**	3/8	1 1/8	12	**.015**
9/16	1 3/4	27 " 30	**.01**	5/16	1	9	**.02**
1/2	1 1/2	21 " 24	**.01**	1/4	3/4	6	**.02**
7/16	1 1/4	15 " 18	**.01**	3/16	1/2	6 fine	**.025**

TILLER ROPE AND SASH CORDS

TILLER ROPE

Fig. 25347A

COMPOSED OF 6 ROPES AND A HEMP CENTER
EACH ROPE CONSISTING OF 6 STRANDS OF 7 WIRES EACH AND A HEMP CENTER

Diameter Inches	Weight per Foot Pounds	Approximate Breaking Strength Pounds: Iron	Cast Steel	Plough Steel	Price, per Foot: Iron	Cast Steel	Plough Steel
1	1.10	22000	35000	43000	.33	.43	.65
7/8	.84	15500	26000	31200	.27	.36	.55
3/4	.62	11000	18000	23200	.22	.30	.45
5/8	.43	7000	13500	16200	.17	.24	.36
9/16	.35	6300	11000	13200	.14	.20	.29
1/2	.28	5800	9000	10300	.11½	.17	.26
7/16	.21	4000	6500	7800	.10	.15	.23
3/8	.16	3000	4800	5800	.09	.14	.21
5/16	.11	1900	3600	4000	.08	.12½	.18
1/4	.07	1300	2500	3000	.07½	.11	.16

These ropes are made of 6 independent wire ropes with hemp centers, in turn wound about a hemp center. This method of construction renders these ropes exceedingly flexible.

When tiller ropes are galvanized or tinned, add 10 per cent to list price.

IRON AND GALVANIZED SASH CORDS

Fig. 25347B

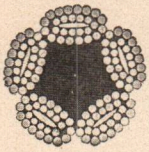
COMPOSED OF 6 STRANDS AND A COTTON CENTER
7 WIRES TO THE STRAND

Diameter Inches	Weight per Foot Pounds	Approximate Breaking Strain Pounds: Bright Iron	Annealed Iron	Price, per Foot: Iron	Galvanized Iron
1/4	.100	2200	1600	.03	.04
7/32	.076	1809	1254	.02¾	.03½
3/16	.056	1417	947	.02¼	.03
1/8	.025	790	467	.01¾	.02¼
3/32	.014	510	280	.01½	.02
1/16	.006	262	132	.01¼	.01¾

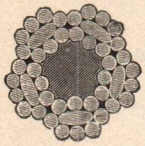
NOTE.—Annealed sash cords at the same price as bright.

HERCULES RED STRAND WIRE ROPE

STYLE A, 5x28



STYLE C, 5x9



PATENT FLATTENED STRAND
HEMP CENTER

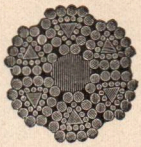
HERCULES WIRE ROPE

(TRADE-MARK REGISTERED.)

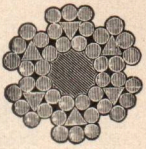
A. Leschen & Sons Rope Co.
Sole Manufacturers

Fig. 7960A

STYLE B,6x25



STYLE D, 6x8



HOISTING

Diameter Inches	Approx. Weight per Foot Pounds STYLE A	B	Approximate Breaking Strain in Tons, 2000 Lbs. STYLE A	B	Useful Working Load in Tons, 2000 Lbs. STYLE A	B	Size of Drum or Sheave Advised, Feet	Price per Foot
3/8	.22	.25	6.75	7.4	1.35	1.5	2	.18¼
1/2	.39	.45	12.1	13.3	2.42	2.7	2¾	.20¾
9/16	.50	.58	14.5	16	2.9	3.2	3	.25
5/8	.62	.72	19	21	3.8	4.2	3½	.28
3/4	.89	1.00	26.3	29	5.26	5.8	4	.37½
7/8	1.20	1.38	35	39	7	7.8	4½	.49
1	1.58	1.80	45	50	9	10	5	.60
1⅛	2.00	2.30	56	62	11.2	12.4	6	.71
1¼	2.45	2.80	69	76	13.8	15.2	7	.89
1⅜	....	3.45	....	92	16.	18.4	7½	1.12
1½	....	4.00	....	108	....	21.6	8	1.37
1⅝	....	4.75	....	121	....	24.2	8½	1.56
1¾	....	5.60	....	146	....	29.2	9	2.08
2	....	7.25	....	183	....	36.6	11	2.25
2¼	....	9.20	....	231	....	46.2	12	2.85

HAULAGE AND TRANSMISSION

Diameter Inches	Approx. Weight per Foot Pounds STYLE C	D	Approximate Breaking Strain in Tons, 2000 Lbs. STYLE C	D	Useful Working Load in Tons, 2000 Lbs. STYLE C	D	Size of Drum or Sheave Advised, Feet	Price per Foot
3/8	.23	.25	6½	7.0	1.3	1.40	2¾	.13¼
1/2	.40	.45	11	11.9	2.2	2.38	3¾	.16¼
5/8	.64	.72	17½	19	3.5	3.8	4½	.25
3/4	.92	1.00	25	27	5	5.4	5¼	.35
7/8	1.24	1.38	33	36	6.6	7.2	6	.44
1	1.65	1.80	42	46	8.4	9.2	6¾	.58
1⅛	2.05	2.30	52	56	10.4	11.2	8	.70
1¼	2.55	2.80	67	73	13.4	14.6	9¼	.88

Hercules Wire Rope is always made with one red strand. Dependable in every emergency and economical under the severest of working conditions.

Patent flattened strand wire rope has greater strength at the same diameter than any other construction. It is especially fitted for severe work over small sheaves and drums under great strain. It is simple in design and correct in principle. A very practical wire rope, often operated with economy under conditions where no other rope can work successfully.

HERCULES RED STRAND WIRE ROPE

HERCULES WIRE ROPE

REG. U. S. PAT. OFF.

Manufactured by
A. LESCHEN & SONS ROPE CO.

Fig. 8297A

HOISTING ROPE
SIX STRANDS OF NINETEEN WIRES EACH AND A HEMP CENTER

Diam. Inches	Approx. Weight per Foot Pounds	Approx. Breaking Strain in Tons, 2000 Lbs.	Useful Working Load in Tons, 2000 Lbs.	Size of Drum or Sheave Advised, Feet	Price per Foot
1/4	.10	3.15	.63	1	.13
5/16	.15	4.50	.9	1 1/4	.13 1/2
3/8	.22	6.75	1.35	1 1/2	.14 1/2
7/16	.30	9.4	1.9	1 3/4	.15 1/2
1/2	.39	12.1	2.4	2	.17
9/16	.50	14.5	2.9	2 1/4	.19
5/8	.62	19	3.8	2 1/2	.22 1/2
3/4	.89	26.3	5.3	3	.31
7/8	1.20	35	7	3 1/2	.39
1	1.58	45	9	4	.50
1 1/8	2	56	11	4 1/2	.62
1 1/4	2.45	69	14	5	.75
1 3/8	3	84	17	5 1/2	.90
1 1/2	3.55	98	20	6	1.10
1 5/8	4.15	110	22	6 1/2	1.30
1 3/4	4.85	133	27	7	1.60
1 7/8	5.55	150	30	8	1.75
2	6.30	166	33	8	1.85
2 1/4	8	210	42	9	2.50
2 1/2	9.85	263	53	10	2.80
2 3/4	11.95	315	63	11	3.45

HAULAGE AND TRANSMISSION ROPE
SIX STRANDS OF SEVEN WIRES EACH AND A HEMP CENTER

Diam. Inches	Approx. Weight per Foot Pounds	Approx. Breaking Strain in Tons, 2000 Lbs.	Useful Working Load in Tons, 2000 Lbs.	Size of Drum or Sheave Advised, Feet	Price per Foot
3/8	.22	6 1/2	1.3	2 1/2	.08 3/4
7/16	.30	7 3/4	1.5	3	.11 1/2
1/2	.39	11	2.2	3 1/2	.13 1/2
9/16	.50	13	2.6	4	.17
5/8	.62	17 1/2	3.5	4 1/2	.20 1/2
11/16	.75	20	4	4 3/4	.24 1/2
3/4	.89	25	5	5	.28 1/2
7/8	1.20	33	6.6	6	.37
1	1.58	42	8.4	7	.48
1 1/8	2	52	10	8	.58
1 1/4	2.45	67	13	9	.72
1 3/8	3	79	16	10	.88
1 1/2	3.55	90	18	11	1.05

Hercules Wire Rope is a trade-marked rope, and in order to designate the finished product so that all may recognize it, all Hercules Wire Rope is made with one red strand.

PLOUGH STEEL WIRE ROPE

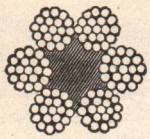


Fig. 5556A

A. Leschen & Sons Rope Company

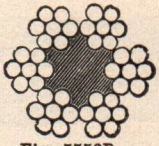


Fig. 5556B

HOISTING
6 STRANDS OF 19 WIRES EACH AND A HEMP CENTER

Diameter Inches	Price per Foot	Approx. Weight per Foot Pounds	Approx. Breaking Strain in Tons, 2000 Lbs.	Useful Working Load in Tons, 2000 Lbs.	Size of Drum or Sheave Advised, Feet
1/4	.12	.10	2.65	.53	1.
5/16	.12 1/4	.15	3.8	.76	1.25
3/8	.12 1/2	.22	5.75	1.15	1.50
7/16	.13	.30	8.	1.6	1.75
1/2	.14	.39	10.	2.	2.
9/16	.16	.50	12.3	2.4	2.25
5/8	.19	.62	15.5	3.1	2.5
3/4	.26	.89	23.	4.6	3.
7/8	.34	1.20	29.	5.8	3.5
1	.43	1.58	38.	7.6	4.
1 1/8	.54	2.	47.	9.4	4.5
1 1/4	.65	2.45	58.	12.	5.
1 3/8	.79	3.	72.	14.	5.5
1 1/2	.93	3.55	82.	16.	6.
1 5/8	1.08	4.15	94.	19.	6.5
1 3/4	1.30	4.85	112.	22.	7.
1 7/8	1.46	5.55	127.	25.	8.
2	1.58	6.30	140.	28.	8.
2 1/4	2.00	8.	186.	37.	9.
2 1/2	2.50	9.85	229.	46.	10.
2 3/4	3.00	11.95	275.	55.	11.

HAULAGE
6 STRANDS OF 7 WIRES EACH AND A HEMP CENTER

Diameter Inches	Price per Foot	Approx. Weight per Foot Pounds	Approx. Breaking Strain in Tons, 2000 Lbs.	Useful Working Load in Tons, 2000 Lbs.	Size of Drum or Sheave Advised, Feet
9/32	.05 1/2	.12 1/2	3.4	.68	1 3/4
5/16	.06	.15	4.4	.88	2 1/4
3/8	.06 3/4	.22	5.9	1.2	2 3/4
7/16	.09	.30	7.	1.4	3
1/2	.11 1/2	.39	10.	2.	3 1/2
9/16	.14 1/2	.50	12.	2.4	4
5/8	.17 1/2	.62	16.	3.2	4 1/2
11/16	.21	.75	18.	3.6	4 3/4
3/4	.24 1/2	.89	23.	4.6	5
7/8	.32	1.20	31.	6.2	6
1	.41	1.58	38.	7.6	7
1 1/8	.51	2.	47.	9.4	8
1 1/4	.62	2.45	60.	12.	9
1 3/8	.76	3.	72.	14.4	10
1 1/2	.90	3.55	82.	16.4	11

Plough steel wire rope gets its name from a quality of steel originally used in steam plowing, a class of duty requiring a rope able to drag over sharp stones, stumps and rough ground without abrasion.

The tensile strength developed in plough steel wire rope is high, and this rope is successfully used where heavy work is performed under conditions where sufficiently large drums and sheaves are practicable.

IRON ELEVATOR WIRE ROPE

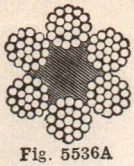


Fig. 5536A

A. Leschen & Sons Rope Company

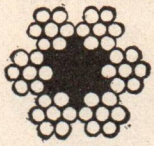


Fig. 5536B

HOISTING
6 STRANDS OF 19 WIRES EACH AND A HEMP CENTER

Diameter Inches	Approx. Weight per Foot Pounds	Approx. Breaking Strain in Tons, 2000 Lbs.	Useful Working Load in Tons, 2000 Lbs.	Size of Drum or Sheave Advised, Feet	Price per Foot
1/4	.10	1.1	.22	1.50	.06½
5/16	.15	1.5	.30	2.	.06¾
3/8	.22	2.4	.48	2.25	.07
7/16	.3	2.9	.58	2.75	.07½
1/2	.39	3.9	.78	3.	.08½
9/16	.5	4.7	.94	3.5	.10
5/8	.62	6.	1.20	4.	.12
3/4	.89	8.5	1.70	4.5	.16
7/8	1.2	11.8	2.36	5.5	.20
1	1.58	14.5	2.90	6.	.26
1 1/8	2.	18.6	3.72	7.	.33
1 1/4	2.45	22.8	4.56	7.5	.40

TRANSMISSION AND STANDING
6 STRANDS OF 7 WIRES EACH AND A HEMP CENTER

Diameter Inches	Approx. Weight per Foot Pounds	Approx. Breaking Strain in Tons, 2000 Lbs.	Useful Working Load in Tons, 2000 Lbs.	Size of Drum or Sheave Advised, Feet	Price per Foot
9/32	.12½	1.2	.24	3.	.03¼
5/16	.15	1.7	.34	3.5	.03¾
3/8	.22	2.2	.44	4.	.04½
7/16	.3	2.6	.52	4.5	.05½
1/2	.39	3.7	.74	5.5	.06½
9/16	.5	4.8	.96	6.	.08¼
5/8	.62	6.	1.2	7.	.10
11/16	.75	7.3	1.5	7.25	.12
3/4	.89	8.8	1.7	7.5	.14
7/8	1.2	12.	2.4	9.	.18½
1	1.58	15.	3.	10.5	.24
1 1/8	2.	19.	3.	12.	.30
1 1/4	2.45	23.	4.6	13.	.36

Substituting iron rope for steel in any service is seldom satisfactory and the manufacturers should be consulted with regard to its advisability in other than its well-known uses.

CAST STEEL WIRE ROPE

HOISTING ROPE

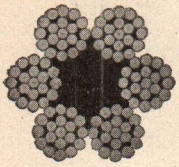


Fig. 5279A

A. Leschen & Sons Rope Company

HAULAGE AND TRANSMISSION ROPE

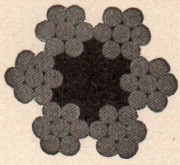


Fig. 5279B

HOISTING ROPE
6 STRANDS OF 19 WIRES EACH AND A HEMP CENTER

Diam. Inches	Approx. Weight per Foot Pounds	Approx Breaking Strength in Tons, 2000 Lbs.	Usual Working Load in Tons of 2000 Lbs.	Diam. of Drum or Sheave Advised, Feet	Price per Foot
1/4	.10	2.2	.44	1	.09
5/16	.15	3.1	.62	1.25	.09 1/4
3/8	.22	4.8	.96	1.50	.09 1/2
7/16	.30	6.5	1.30	1.75	.10
1/2	.39	8.4	1.68	2.	.11
9/16	.50	10.	2.	2.25	.12
5/8	.62	12.5	2.5	2.5	.14
3/4	.89	17.5	3.5	3.	.19
7/8	1.20	23.	4.6	3.5	.24
1	1.58	30.	6.	4.	.31
1 1/8	2.	38.	7.6	4.5	.38
1 1/4	2.45	47.	9.4	5.	.46
1 3/8	3.	56.	11.2	5.5	.56
1 1/2	3.55	64.	12.8	6.	.66
1 5/8	4.15	72.	14.4	6.5	.77
1 3/4	4.85	85.	17.	7.	.90
1 7/8	5.55	96.	19.	8.	1.02
2	6.30	106.	21.2	8.	1.16
2 1/4	8.	133.	26.6	9.	1.44
2 1/2	9.85	170.	34.	10.	1.75
2 3/4	11.95	211.	42.2	11.	2.10

HAULAGE AND TRANSMISSION ROPE
6 STRANDS OF 7 WIRES EACH AND A HEMP CENTER

Diam. Inches	Approx. Weight per Foot Pounds	Approx. Breaking Strength in Tons, 2000 Lbs.	Usual Working Load in Tons of 2000 Lbs.	Diam. of Drum or Sheave Advised, Feet	Price per Foot
9/32	.12 1/2	2.5	.50	1 3/4	.04
5/16	.15	3.5	.70	2 1/4	.04 1/2
3/8	.22	4.6	.92	2 3/4	.05 1/2
7/16	.30	5.5	1.1	3	.06 1/2
1/2	.39	7.7	1.5	3 1/2	.08
9/16	.50	10.	2.	4	.10
5/8	.62	13.	2.6	4 1/2	.12
11/16	.75	15.4	3.1	4 3/4	.14 1/2
3/4	.89	18.6	3.7	5	.17
7/8	1.20	24.	4.8	6	.22 1/2
1	1.58	31.	6.2	7	.29
1 1/8	2.00	37.	7.4	8	.36
1 1/4	2.45	46.	9.2	9	.43
1 3/8	3.00	53.	10.6	10	.51
1 1/2	3.55	63.	12.6	11	.60

GALVANIZED STRAND

REGULAR AND EXTRA GALVANIZED STEEL STRAND

FOR SMOKESTACKS, GUY SIGNAL STRAND, TROLLEY SPAN WIRE

Fig. 25357A

Composed of 7 wires twisted together.

Diam. Inches	Approx. Weight per 1000 Ft. Pounds	Approx. Breaking Strain Pounds	Price per 100 Feet
1	2100	32000	.....
7/8	1610	24000	.....
3/4	1200	18000	**14.50**
5/8	800	14000	**8.50**
9/16	650	11000	**7.00**
1/2	510	8500	**5.50**
7/16	415	6500	**4.50**
3/8	295	5000	**3.50**
5/16	210	3800	**2.50**
1/4	125	2300	**1.75**
7/32	95	1800	**1.50**
3/16	75	1400	**1.25**

Intermediate sizes take next higher list.

Sizes above 1/2 inch in diameter are made of 12 or 19 wires, and at special prices.

The breaking strains of the sizes given in the above table are based on the use of low carbon steel. They can be increased in any size up to the highest obtainable limit by the use of the higher grades of material.

Extra galvanized steel wire strand is sold at special discount from above list.

EXTRA GALVANIZED SPECIAL STRENGTH STRAND

Diam. Inches	Ultimate Strength, Pounds			Price, per 100 Feet		
	S. & M. Steel	High Strength	Extra High Strength	S. & M. Steel	High Strength	Extra High Strength
5/8	19000	25000	42500	**8.25**	**12.00**	**14.60**
1/2	11000	18000	27000	**5.25**	**7.25**	**8.80**
7/16	9000	15000	22500	**4.30**	**6.00**	**7.20**
3/8	6800	11500	17250	**3.25**	**4.40**	**5.25**
5/16	4860	8100	12100	**2.50**	**3.20**	**4.25**
9/32	4380	7300	10900	**2.05**	**2.80**	**3.50**
1/4	3060	5100	7600	**1.90**	**2.25**	**2.85**
3/16	2000	3300	4900	**1.35**	**1.80**	**2.40**
1/8	900	1500	2250	**.90**	**1.20**	**1.60**

WIRE ROPE FASTENINGS

CLOSED SOCKET

Fig. 1414A

OPEN SOCKET

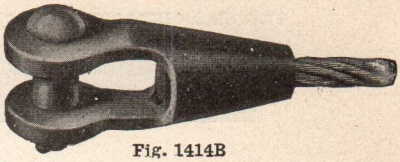


Fig. 1414B

CLOSED SOCKETS

Diameter of Rope.....inches	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8
Loose, for Iron or Steel Rope..each	.60	.65	.75	.80	1.00	1.10	1.35	1.80	2.50
Fastened, for Iron or Steel Rope "	1.50	1.55	1.75	1.95	2.15	2.35	2.65	3.30	4.50
Diameter of Rope.....inches	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/4
Loose, for Iron or Steel Rope..each	3.50	4.00	6.00	6.50	9.00	10.00	16.00	24.00	26.00
Fastened, for Iron or Steel Rope "	5.75	6.85	9.50	10.75	14.00	16.00	24.00	33.50	37.00

OPEN SOCKETS

Diameter of Rope.....inches	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8
Loose, for Iron or Steel Rope..each	.85	.90	1.20	1.25	1.60	1.70	2.10	2.70	3.40
Fastened, for Iron or Steel Rope "	1.75	1.80	2.20	2.40	2.75	2.95	3.40	4.20	5.40
Diameter of Rope.....inches	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/4
Loose, for Iron or Steel Rope..each	4.50	5.00	8.00	8.50	11.50	12.50	22.00	34.00	37.00
Fastened, for Iron or Steel Rope "	6.75	7.85	11.50	12.75	16.50	18.50	30.00	43.50	48.00

HOOK AND THIMBLE

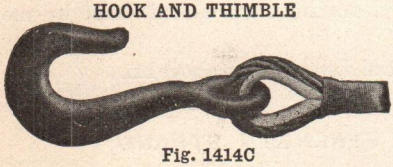


Fig. 1414C

SISTER HOOK AND THIMBLE

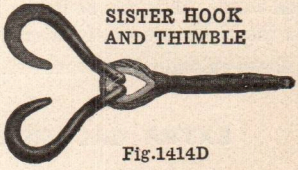


Fig.1414D

Diameter of Rope.....inches	1/4	5/16	3/8	7/16	1/2	9/16	5/8
Loose, for Iron Rope.....each	.50	.50	.55	.60	.65	.75	.85
Fastened, for Iron Rope..... "	1.50	1.50	1.60	1.70	1.80	1.95	2.20
Loose, for Steel Rope..... "	.65	.65	.70	.75	.80	1.10	1.40
Fastened, for Steel Rope..... "	1.75	1.75	1.85	1.95	2.05	2.40	2.85
Diameter of Rope.....inches	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Loose, for Iron Rope.....each	1.10	1.40	1.90	2.40	2.65	3.40	5.00
Fastened, for Iron Rope..... "	2.85	3.70	4.65	5.90	6.90	8.65	11.00
Loose, for Steel Rope..... "	1.85	2.90	3.75	4.40	4.60	5.40	7.00
Fastened, for Steel Rope..... "	3.75	5.35	6.70	8.15	9.20	11.15	13.50

WIRE ROPE FASTENINGS

CROSBY CLIP

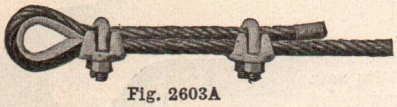


Fig. 2603A

EXTRA HEAVY CLAMP

Fig. 2603B

CROSBY CLIPS

Diameter of Rope..... inches	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Price..... each	.35	.35	.40	.45	.45	.55	.65	.75	.85
Diameter of Rope..... inches	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/4	2 1/2
Price..... each	.95	1.10	1.25	1.50	3.50	5.50	7.50	9.50	11.50

EXTRA HEAVY CLAMPS

Diameter of Rope..... inches	5/16	7/16	1/2	9/16	5/8	3/4	13/16	7/8	1
Price..... each	.30	.45	.60	.60	.90	1.05	1.15	1.30	1.75
Diameter of Rope..... inches	1 1/16	1 1/8	1 3/16	1 1/4	1 7/16	1 5/8	1 3/4	2	2 1/4
Price..... each	1.90	1.90	2.25	2.50	3.80	5.00	5.50	8.50	13.75

GALVANIZED OVAL THIMBLE

Fig. 2603C

THIMBLE SPLICED ON ROPE

Fig. 2603D

GALVANIZED OVAL THIMBLES

Diameter of Rope..... inches	1/4	5/16	3/8	7/16	1/2	9/16	5/8
Width of Score..... inches	1/4	5/16	3/8	7/16	1/2	9/16	5/8
Price..... each	.08	.08	.09	.10	.11	.12	.13
" Spliced, for Iron Rope..... "	1.00	1.00	1.05	1.10	1.15	1.20	1.45
" " " Steel " ..... "	1.10	1.10	1.15	1.20	1.25	1.30	1.55
Diameter of Rope..... inches	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Width of Score..... inches	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Price..... each	.15	.16	.20	.25	.33	.42	.50
" Spliced, for Iron Rope..... "	1.85	2.40	2.85	3.65	4.35	5.25	6.00
" " " Steel " ..... "	2.00	2.55	3.00	3.90	4.70	5.75	6.50

Thimbles are secured to the ropes with four tucks of each strand. The seizing is not used for strength purposes, as it serves solely to make a finished rope end and protect the hands of operators from injury when handling it.

VULCAN HOOKS

WELDLESS

WITH EYE

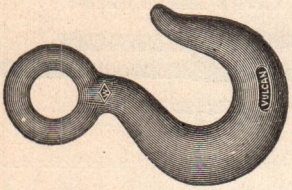


Fig. 9309A

Every Vulcan Hook Tested to 50% Beyond Its Safe Working Load

WITH SHANK

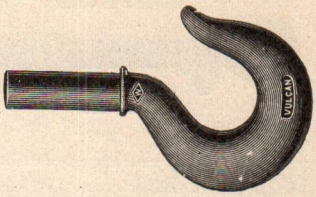


Fig. 9309B

WITH EYE

Number of Hook	22	23	24	25	26	27	28	29
For U. S. Std. Cable Chain..size	1/4 & 5/16	1/4 & 5/16	3/8	7/16	1/2 & 9/16	5/8	11/16	3/4
Diam. of Eye, Inside.....inches	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8
" " " Outside... "	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4
Extreme Dimensions, Length..... "	4 3/8	4 7/8	5 3/8	6 3/16	6 7/8	7 5/8	8 9/16	9 9/16
" " Width..... "	2 7/8	3 1/8	3 1/2	3 7/8	4 3/8	4 7/8	5 5/8	6 3/8
Safe Working Load....net tons	.5	.6	.7	1.2	1.7	2.1	2.5	3.
Average Load ..... "	.9	1.2	1.5	2.5	3.5	4.2	5.4	6.2
Approximate Load to Straighten .. "	1.9	2.3	3.	5.7	7.	8.5	10.	13.
Price .....each	.36	.43	.53	.73	1.05	1.50	2.10	2.85

Number of Hook	30	31	32	33	34	35	36	36A
For U. S. Std. Cable Chain..size	13/16	7/8 & 15/16	1	1 1/16 & 1 1/8	1 3/16 & 1 1/4	1 1/4 – 1 7/16	1 1/2	...
Diam. of Eye, Inside.....inches	1 3/4	2	2 3/8	2 3/4	3 1/8	3 1/2	4	4
" " " Outside ... "	3 1/2	4	4 5/8	5 1/4	6 1/8	7	8 1/2	8 1/2
Extreme Dimensions, Length..... "	10 3/8	11 1/2	13.	14 3/4	16 3/4	19 1/8	22 3/4	22 3/4
" " Width..... "	6 7/8	7 1/2	8 1/4	9 1/4	11	13 1/2	15	15
Safe Working Load ....net tons	4.	4.7	5.5	6.8	8.	11.	20.	25
Average Load..... "	8.	9.	11.	13.	17.	21.	40.	50
Approximate Load to Straighten .. "	17.	19.	26.	32.	35.	48.	80.	....
Price.....each	3.70	4.70	6.40	9.40	18.50	35.00	86.00	100.00

A hook for safety chains on R. R. cars, with eye at right angles to hook. Can be furnished to order in reasonable quantities. Prices on application.

WITH SHANK

Number of Hook	2	3	4	5	6	7	8	9	10
For U. S. Std. Cable Chain..size	1/4 & 5/16	9/16 & 5/16	3/8	7/16	1/2 & 9/16	5/8	11/16	3/4	13/16
Diameter of Shank...inches	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8
New Length of Shank "	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4
Extreme Dimensions, Length... "	5	5 1/2	6	6 3/4	7 1/2	8 1/4	9 1/4	10 1/4	11
" " Width... "	2 7/8	3 1/8	3 1/2	3 7/8	4 3/8	4 7/8	5 5/8	6 3/8	6 7/8
Safe Working Load.net tons	.5	.6	.7	1.2	1.7	2.1	2.5	3.	4.
Average Load ..... "	.9	1.2	1.5	2.5	3.5	4.2	5.4	6.2	8.
Approximate Load to Straighten "	1.9	2.3	3.	5.7	7.	8.5	10.	13.	17.
Price .....each	.32	.37	.44	.58	.85	1.25	1.80	2.45	3.20

Number of Hook	11	12	13	14	15	15 1/2	16	16A	....
For U. S. Std. Cable Chain..size	7/8 & 15/16	1	1 1/16 & 1 1/8	1 3/16 & 1 1/4	1 1/4 – 1 1/2	1 1/4 – 1 1/2	1 1/2		....
Diameter of Shank...inches	1 1/2	1 5/8	1 3/4	2	2 3/8	2 1/2	2 3/4	2 3/4	....
New Length of Shank "	4 1/4	4 1/2	5	5 1/2	6	6 1/2	7	7	....
Extreme Dimensions, Length... "	12	13	14 1/2	16	17 7/8	19 3/4	21 1/2	21 1/2	....
" " Width... "	7 1/2	8 1/4	9 1/4	11	13 1/2	14 1/2	15	15	....
Safe Working Load.net tons	4.7	5.5	6.8	8.	11.	15.	20.	25.	....
Average " " "	9.	11.	13.	17.	21.	25.	40.	50.	....
Approximate Load to Straighten "	19.	26.	32.	35.	48.	55.	80.	....	....
Price .....each	4.10	5.60	7.80	12.00	23.00	39.00	60.00	70.00	...

Tobin bronze hooks from standard or special dies to order in quantities. Prices on application.

TURNBUCKLES

WITH RIGHT AND LEFT STUB BOLT ENDS

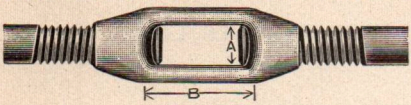


Fig. 146A

WITHOUT STUBS
TAPPED RIGHT AND LEFT

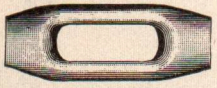


Fig. 146B

THREADED EYE BOLTS

Fig. 146C

THREADED HOOK AND EYE BOLTS

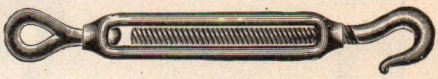


Fig. 146D

THAEADED HOOK BOLTS

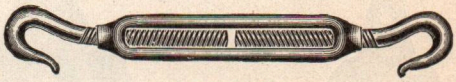


Fig. 146E

WITH OR WITHOUT STUBS

Diam. of Screw Inches	Price, Each — Inside Openings, B, Inches 3	6	9	12	15
1/4	.36	....	....	....	....
5/16	.38	....	....	....	....
3/8	.40	.40	....	....	....
7/16	.42	.42	....	....	....
1/2	.45	.45	.56	.C8	.90
9/16	.48	.48	.60	.72	.96
5/8	.50	.50	.63	.75	1.00
3/4	.63	.63	.79	.95	1.25
7/8	.75	.75	.94	1.13	1.50
1	.88	.88	1.10	1.32	1.76
1 1/8	1.00	1.00	1.25	1.50	2 00
1 1/4	1.25	1.25	1.56	1.88	2.50
1 3/8	....	1.38	1.73	2 07	2.76
1 1/2	....	1.50	1.88	2.25	3.00
1 3/8	....	1.75	2 19	2.63	3.50
1 3/4	....	2.00	2 50	3.00	4 00
1 3/8	....	2.25	2.81	3.38	4 50
2	....	2.65	3.31	3.98	5 30
2 1/4	....	3.50	4.38	5.25	7 00
2 1/2	....	4.50	5.63	6.75	9.00

Diam. of Screw Inches	Price, Each — Inside Openings, B, Inches 3	6	9	12	18
5/8	1.25	1.75	....	....	....
3/4	1.58	2.20	....	....	....
7/8	1.88	2.62	....	....	....
1	2.20	3.08	3.52	....	....
1 1/8	2.50	3.50	4 00	6.00	8 00
1 1/4	3.13	4.37	5 00	7.50	10 00
1 3/8	3.45	4.83	5 52	8 28	11.04
1 1/2	3.75	5.25	6 00	9 00	12 00
1 5/8	4.38	6.12	7 00	10 50	14.00
1 3/4	5.00	7.00	8 00	12 00	16.00
1 7/8	5.63	7.87	9 00	13 50	18.00
2	6.63	9.27	10 60	15.90	20.20
2 1/4	8 75	12.25	14.00	21.00	28.00
2 1/2	11.25	15.75	18.00	27.00	36.00

BLACK OR GALVANIZED

Diam. of Screw Inches	Price, Each — Inside Openings, B, Inches 18	24	36	48	72
1/4	.40	....	....	....	....
5/16	.45	....	....	....	....
3/8	.65	.C5	....	....	....
7/16	.72	.72	....	....	....
1/2	.72	.72	.85	.95	1.15
9/16	.80	.80	.95	1 05	1.30
5/8	.80	.80	.90	1 05	1.30
3/4	1.10	1.10	1.25	1.40	1.70
7/8	1.35	1.35	1.55	1.70	2 10
1	1.65	1.65	1.85	2 05	2 50
1 1/8	2.10	2.10	2 35	2 55	3 05
1 1/4	2.65	2.65	2 05	3 25	3 90
1 3/8	....	3.15	3.45	3 80	4 50
1 1/2	....	3.70	4.05	4.45	5 20
1 5/8	....	4.65	....	5 50	6 40
1 3/4	....	5.40	....	6.40	7.40
1 7/8	....	6.50	....	7 60	8 75
2	....	7.75	....	9.10	10.40

Diam. of Screw Inches	Price, Each — Inside Openings, B, Imches 18	24	36	48	72
5/8	1.55	2.05	....	....	....
3/4	2.00	2.65	....	....	....
7/8	2.45	3.20	....	....	....
1	2 95	3.80	4.25	....	....
1 1/8	3.55	4.55	5 05	....	....
1 1/4	4.50	5.75	6 40	8 00	....
1 3/8	5.20	6.60	7 25	10.00	....
1 1/2	5 95	7.45	8 20	11.20	14.20
1 5/8	7 25	9.00	9 90	13.40	16 90
1 3/4	8 40	10.40	11 40	15 40	19.40
1 7/8	9 85	12.10	13 25	17.75	22 25
2	11.75	14.40	15.75	21.00	26.30

Prices of 2 1/4 and 2 1/2-inch on application.

WOOD TACKLE BLOCKS

INSIDE IRON STRAPPED BLOCKS WITH IRON SHEAVES, LOOSE HOOKS

SINGLE

Fig. 1422A

DOUBLE

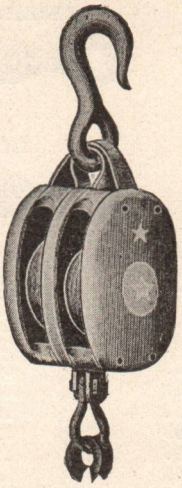


Fig. 1422B

TRIPLE

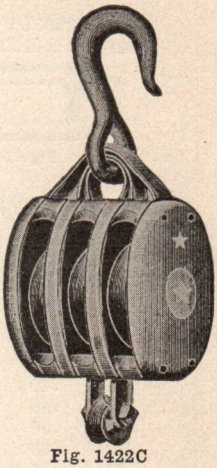


Fig. 1422C

We furnish beckets on all single, one half double and one third triple blocks, without charge. If a greater number are wanted, add for each additional becket five cents net for beckets in blocks 5 inches and under, and one cent per inch of shell (in length) for each additional becket in sizes larger.

Dimensions, Inches			Price Iron Bushed Each			Price Roller Bushed Each			Price Metaline Bushed, Each		
Sheaves	Rope	Shell	Single	Double	Triple	Single	Double	Triple	Single	Double	Triple
1¾x ½x⅜	⅜	3	.70	1.30	1.75	1.10	2.00	2.90	....	.....	.....
2 x ½x⅜	⅜	3½	.75	1.45	2.00	1.15	2.20	3.15	....	.....	.....
2¼x ⅝x⅜	½	4	.85	1.60	2.15	1.20	2.25	3.25	1.50	2.90	4.15
3 x ¾x⅜	⅝	5	.90	1.75	2.25	1.25	2.35	3.50	1.75	3.35	4.75
3½x1 x½	⅝–¾	6	1.10	2.00	2.90	1.50	2.85	4.40	2.20	4.00	5.80
4¼x1 x½	⅞	7	1.30	2.40	3.50	1.70	3.35	5.00	2.50	4.50	6.70
4¾x1⅛x⅝	1	8	1.65	2.85	4.25	2.25	4.15	6.00	3.25	5.70	8.50
5½x1⅛x⅝	1	9	1.85	3.40	4.75	2.50	4.70	7.25	3.70	6.75	10.00
6¼x1¼x⅝	1⅛	10	2.75	4.50	6.25	3.50	6.00	8.50	4.75	8.50	12.50
7¼x1¼x¾	1⅛	11	4.45	7.50	10.65	5.30	9.20	13.20	....	.....	.....
8 x1⅜x¾	1¼	12	4.45	7.50	10.65	5.30	9.20	13.20	6.75	12.50	18.50
9 x1½x¾	1¼	13	7.00	10.50	15.00	8.15	12.80	18.45	9.75	17.00	25.00
9½x1⅝x⅞	1⅜	14	7.00	10.50	15.00	8.15	12.80	18.45	9.75	17.00	25.00
10 x1⅝x⅞	1½	15	8.00	13.00	18.00	9.25	15.50	21.75	....	.....	.....
11 x1¾x⅞	1⅝	16	10.00	15.00	22.00	11.50	18.00	26.50	....	.....	.....

EXTRA SHEAVES

No. 1, FOR INSIDE IRON STRAPPED BLOCKS AND IDEAL STEEL BLOCKS

Size of Sheave	For Blocks Inches	Iron Bushed, also Star Graphite Bushed	Patent Six-roller, also Five-roller Bushed	Star Metaline, also Graphite-bronze Bushed
1¾x ½x⅜	3	.09	.40	....
2 x ½x⅜	3½	.10	.42	.75
2¼x ⅝x⅜	4	.12	.45	.80
2¾x ¾x⅜	4½	.15	.50	.85
3 x ¾x⅜	5	.20	.55	.90
3½x1 x½	6	.25	.65	1.40
4¼x1 x½	7	.30	.75	1.50
4¾x1⅛x⅝	8	.35	1.00	1.85
5½x1⅛x⅝	9	.45	1.10	1.95
6¼x1¼x⅝	10	.55	1.35	2.25
7¼x1¼x¾	11	.70	1.65	2.60
8x 1⅜x¾	12	.90	1.90	2.95
9 x1½x¾	13	1.20	2.40	3.25
9½x1⅝x⅞	14	1.40	2.65	3.60
10 x1⅝x⅞	15	1.50	2.85	3.90
11 x1¾x⅞	16	1.70	3.20	4.90

No. 4, FOR TARBOX NEW STYLE STEEL BLOCKS

Special Sheave Order Number State Bushing Required	For Blocks Inches	Iron Bushed, also Star Graphite Bushed	Patent Six-roller Bushed	Graphite Bronze
5003	3	.09	.40	....
5004	4	.12	.45	.80
5005	5	.20	.55	.90
5006	6	.25	.65	1.40
5007	7	.35	1.00	1.60
5008	8	.40	1.15	1.90
5009	9	.50	1.25	2.10
5010	10	.65	1.60	2.75
5012	12	1.05	2.10	3.25
5014	14	1.50	2.85	4.20

No. 5, FOR LOCKPORT AND TARBOX SNATCH BLOCKS

Size of Sheave	For Blocks Inches	Iron Bushed, also Star Graphite Bushed	Patent Six-roller also Five-roller Bushed	Star Metaline, also Graphite-bronze Bushed
3 x1⅛x ½	6	.30	.75	1.40
3½x1¼x ½	7	.40	.85	1.65
4½x1⅜x ⅝	8	.50	1.20	1.90
5 x1⅜x ⅝	9	.60	1.30	2.00
5¾x1⅞x ¾	10	1.20	2.40	3.00
6¾x2⅛x ¾	12	1.50	2.85	3.75
8 x2¼x ⅞	14	1.85	3.45	4.50
9 x2⅝x1	16	2.25	4.50	5.50

SNATCH BLOCKS

DROP LINK

WOOD

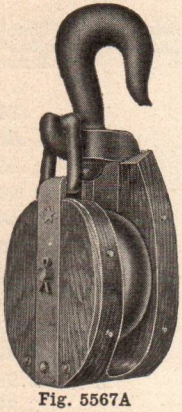


Fig. 5567A

STEEL

Fig. 5567B

TARBOX METAL

Fig. 5567C

DROP LINK

Drop-forged hooks, heads, links and straps extend to bottom of the shell. Wood block shells are cross-bolted and shells of steel block carefully rounded to avoid wearing rope.

Size of Sheave, Inches	Diameter of Rope Inches	Length of Shell, Inches	Price, Each		
			Iron Bushed	Roller Bushed	Metaline or Bronze Bushed
3 x 1⅛ x ½	⅞	6	4.00	4.65	5.25
3½ x 1¼ x ½	⅞	7	4.75	5.50	6.00
4½ x 1⅜ x ⅝	1	8	5.75	6.60	7.25
5 x 1⅜ x ⅝	1⅛	9	6.75	7.75	8.50
5¾ x 1⅞ x ¾	1¼	10	8.50	10.00	11.00
6¾ x 2⅛ x ¾	1½	12	10.00	11.50	13.00
8 x 2¼ x ⅞	1¾	14	13.00	15.00	16.50
9 x 2⅝ x 1	2	16	17.00	20.00	22.00

TARBOX METAL—FOR MANILA ROPE

Drop-forged hooks, heads and links engage each other automatically. The straps interlace the shell and extend to the bottom of the block. Sheaves bear at the hub only, saving contact at edges. They therefore cannot wear sharp and cut the rope.

Size of Sheave, Inches	Diameter of Rope Inches	Length of Shell, Inches	Price, Each		
			Star Metaline Bushed	Five-roller Bushed	Star Pat. Graphite Bushed
3 x 1⅛ x ½	⅞	6	5.75	5.15	4.50
3½ x 1¼ x ½	⅞	7	6.75	6.25	5.50
4½ x 1⅜ x ⅝	1	8	8.00	7.35	6.50
5 x 1⅜ x ⅝	1⅛	9	9.25	8.50	7.50
5¾ x 1⅞ x ¾	1¼	10	12.50	11.50	10.00
6¾ x 2⅛ x ¾	1½	12	15.50	14.00	12.50
8 x 2¼ x ⅞	1¾	14	19.50	18.00	16.00
9 x 2⅝ x 1	2	16	26.00	24.00	21.00

Extra for galvanized hooks and straps.

IDEAL STEEL TACKLE BLOCKS

JAPANNED FORGED STEEL HOOKS, STRAPS, PINS AND SHELLS

SINGLE

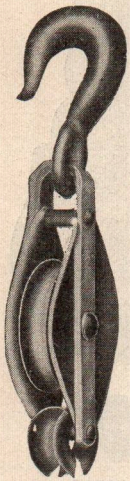


Fig. 9231A

DOUBLE

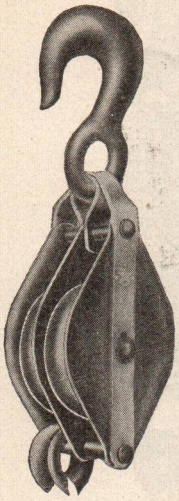


Fig. 9231B

TRIPLE

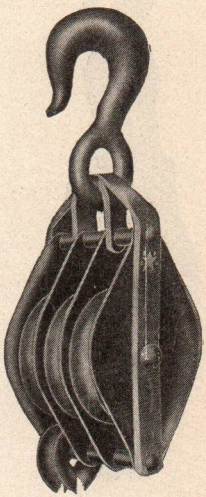


Fig. 9231C

The above blocks are lighter than wood blocks and equally strong. As there is no danger of the shell splitting, they are more durable.

Straps extend full length of shell. giving strength and rigidity to the blocks, and furnishing proper support for beckets.

Shells have nicely rounded edges to protect rope.

Sheaves are same sizes as used in regular wood shell blocks, and are interchangeable.

Dimensions, Inches			Price Iron Bushed, Each			Price Roller Bushed, Each		
Sheaves	Rope	Shell	Single	Double	Triple	Single	Double	Triple
1¾ x ½x⅜	⅜	3	.70	1.30	1.75	1.10	2.00	2.90
2¼ x ⅝x⅜	½	4	.85	1.60	2.15	1.20	2.25	3.25
3 x ¾x⅜	⅝	5	.90	1.75	2.25	1.25	2.35	3.50
3½x1 x½	¾	6	1.10	2.00	2.90	1.50	2.85	4.40
4¼x1 x½	⅞	7	1.30	2.40	3.50	1.70	3.35	5.00
4¾x1⅛x⅝	1	8	1.65	2.85	4.25	2.25	4.15	6.00
6¼x1¼x⅝	1⅛	10	2.75	4.50	6.25	3.50	6 00	8.50
8 x1⅜x¾	1¼	12	4.45	7.50	10.65	5.30	9.20	13.20

Galvanized blocks can be furnished when so ordered.

TARBOX WIDE MORTISE METAL BLOCKS

WITH LOOSE HOOKS

SINGLE

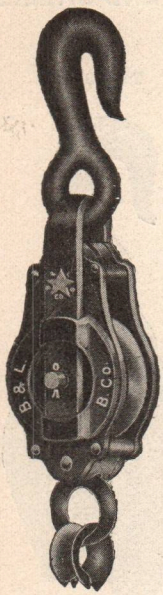


Fig. 7273A

DOUBLE

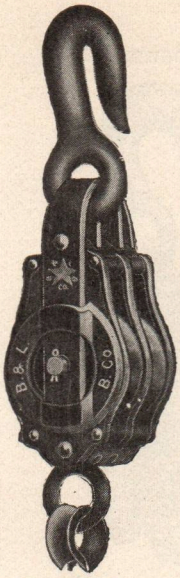


Fig. 7273B

TRIPLE

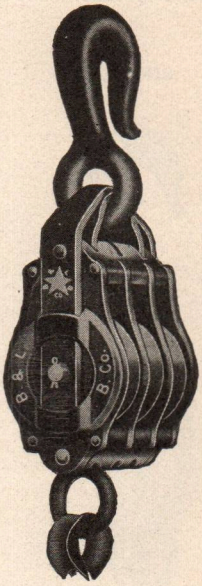


Fig. 7273C

The hooks and straps are exceptionally heavy, and the patent interlacing device of strap and shell add greatly to its strength.

The edges and middles are carefully rounded so that the wearing of the rope is reduced to a minimum. The construction of the shell, moreover, makes it impossible for the sheave to wear sharp at the edges, another important rope-saving feature.

The cast steel shells do not flake off when they become rusty through exposure to dampness, which accounts for the great popularity of this block for use in connection with mining and out-door work.

Size No.	For Rope Diameter Inches	Price Each								
		Iron Bushed			Patent-Roller Bushed			Graphite-Bronze Bushed		
		Single	Double	Triple	Single	Double	Triple	Single	Double	Triple
3	3/8	.70	1.30	1.75	1.10	2.00	2.90	....	....	....
4	1/2	.85	1.60	2.15	1.20	2.25	3.25	1.50	2.90	4.15
5	5/8	.90	1.75	2.25	1.25	2.35	3.50	1.75	3.35	4.75
6	3/4	1.10	2.00	2.90	1.50	2.85	4.40	2.20	4.00	5.80
7	7/8	1.30	2.40	3.50	1.70	3.35	5.00	2.50	4.50	6.70
8	1	1.65	2.85	4.25	2.25	4.15	6.00	3.25	5.70	8.50
9	1 1/8	1.85	3.40	4.75	2.50	4.70	7.25	3.70	6.75	10.00
10	1 1/4	2.75	4.50	6.25	3.50	6.00	8.50	4.75	8.50	12.50
12	1 3/8	4.45	7.50	10.65	5.30	9.20	13.20	6.75	12.50	18.50
14	1 1/2	7.00	10.50	15.00	8.15	12.80	18.45	9.75	17.00	25.00

Furnished with shackles in place of hooks if so desired.

BLOCKS FOR WIRE ROPE

WROUGHT IRON SNATCH BLOCKS

BOSTON

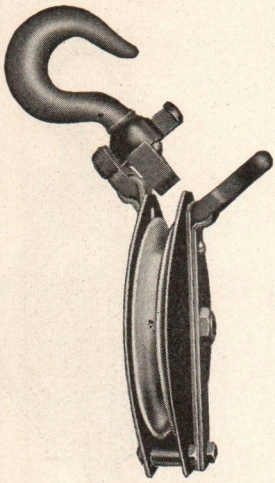


Fig. 13379A

LOCKPORT

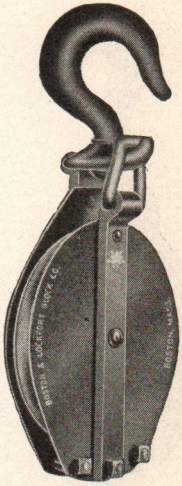


Fig. 13379B

Fitted with self-locking clasp, consisting of a lip and link, and having a center extension piece coming close to the sheave, preventing the wire rope from leaving the sheave. It also prevents the shell from pinching or binding the sheave. Hooks, heads and links are drop-forged. The hook is of the popular flatted type.

Size of Sheave.....inches	6	8	10	12	14
For Wire Rope ..... "	3/8	1/2	5/8	5/8	3/4
Price, Star Metaline Bushed.....each	12.00	15.00	18.00	21.00	24.00
" Graphite-Bronze Bushed..... "	12.00	15.00	18.00	21.00	24.00
" Common Bushed ..... "	11.00	14.00	16.00	18.00	20.00
Size of Sheave.....inches	16	18	20	20	....
For Wire Rope..... "	7/8	1	1 1/4	1 1/2	....
Price, Star Metaline Bushed.....each	33.00	44.00	58.00	68.00	....
" Graphite-Bronze Bushed..... "	33.00	44.00	58.00	68.00	....
" Common Bushed..... "	28.00	38.00	50.00	60.00	....

TARBOX SNATCH BLOCKS

OPEN

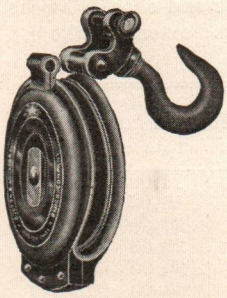


Fig. 13379C

Size, Sheave Inches	Wire Rope Inches	Price, Star Metaline Bushed, Each
6	3/8	14.00
8	1/2	17.00
10	5/8	18.00
12	5/8	21.00
14	3/4	24.00
16	7/8	33.00
18	1	44.00

The above engravings show the new wire rope snatch block, made to fill the demand for a short block having a large sheave and great strength of construction, combined with ease of operation. The sheave has a bearing at the hub alone, and the shell covers the edge of the sheave so the rope cannot become wedged between shell and sheave. Hook and head is drop-forged. The hook is of the popular flatted type.

DIAMOND WIRE ROPE BLOCKS

LOOSE HOOK DOUBLE

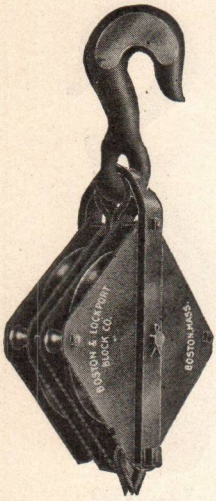


Fig. 1427A

SHACKLES SINGLE

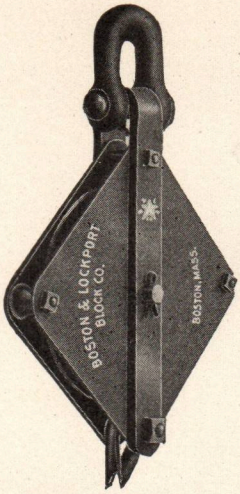


Fig. 1427B

STIFF SWIVEL HOOK DOUBLE

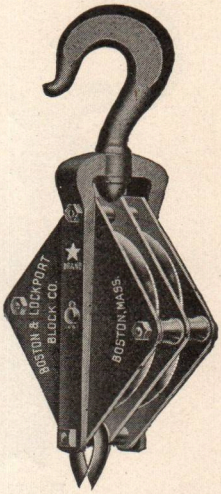


Fig. 1427C

REGULAR

Dimensions		Price, Each Graphite-Bronze Bushed			Price, Each Common Iron Bushed		
Sheave Inches	Rope Inches	Single	Double	Triple	Single	Double	Triple
6x1 x ¾	⅜	9.00	17.00	22.00	6.00	11.00	14.00
8x1¼x ⅞	½	11.00	19.00	24.00	8.00	13.00	16.00
10x1¼x ⅞	⅝	13.00	21.00	28.00	10.00	15.00	20.00
12x1½x1	⅝	15.00	23.00	31.00	12.00	17.00	23.00
14x1½x1⅛	¾	17.00	25.00	34.00	14.00	19.00	26.00
16x1¾x1¼	⅞	25.00	38.00	50.00	21.50	31.00	39.50

HEAVY

These blocks are made of the finest forging steel, loose hook and shackle blocks, having double center plates. The center straps are also double and extend to the bottom of the block.

Dimensions		Price, Each Graphite-bronze Bushed			Price, Each Common Iron Bushed		
Sheave Inches	Rope Inches	Single	Double	Triple	Single	Double	Triple
6x1 x ¾	½	12.00	20.00	28.00	9.00	14.00	20.00
8x1¼x ⅞	½	14.00	22.00	32.00	11.00	16.00	22.50
10x1¼x ⅞	⅝	17.00	26.00	37.00	14.00	20.00	28.00
12x1½x1	⅝	19.00	29.00	41.00	16.00	23.00	31.00
14x1½x1⅛	¾	21.00	31.00	45.00	18.00	25.00	36.00
16x1¾x1¼	⅞	36.00	50.00	65.00	31.00	40.00	46.00
18x1¾x1¼	⅞	40.00	56.00	75.00	34.50	45.00	53.00

WROUGHT IRON GIN BLOCKS

WITH SWIVEL HOOKS FOR MANILA AND WIRE ROPE

MANILA ROPE

REGULAR PATTERN

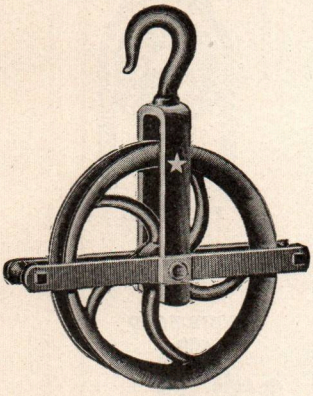


Fig. 7142A

HEAVY PATTERN

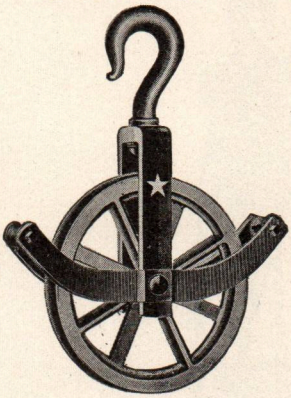


Fig. 7142B

WIRE ROPE DOUBLE

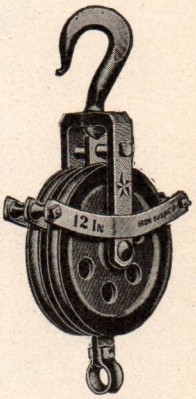


Fig. 7142C

FOR MANILA ROPE, REGULAR AND HEAVY PATTERNS

Regular Pattern		Price, Each			Heavy Pattern		Price, Each		
Sheaves Inches	Rope Inches	Iron Bushed	Roller Bushed	Graphite Bronze or Metaline Bushed	Sheaves Inches	Rope Inches	Iron Bushed	Roller Bushed	Graphite Bronze or Metaline Bushed
6	1	3.15	4.00	4.75	8	1¼	6.00	7.00	8.00
8	1	3.85	4.70	5.50	10	1⅜	8.00	9.00	10.00
10	1	4.55	5.75	6.55	12	1½	10.00	11.00	12.00
12	1	5.80	7.10	7.90	15	1¾	12.00	14.00	15.00
14	1¼	6.30	7.60	8.50	18	1¾	15.00	19.00	20.00
16	1½	8.40	9.70	10.70	..	...	.....	.....	.....

FOR WIRE ROPE

Sheaves Inches	Wire Rope Inches	Price, Graphite Bronze, Each		
		Single	Double	Triple
8	½	11.00	19.00	24.00
10	⅝	13.00	21.00	28.00
12	⅝	15.00	23.00	31.00
14	¾	17.00	25.00	34.00
16	⅞	25.00	38.00	50.00

STAR SAFETY TACKLE BLOCKS

COMPLETE

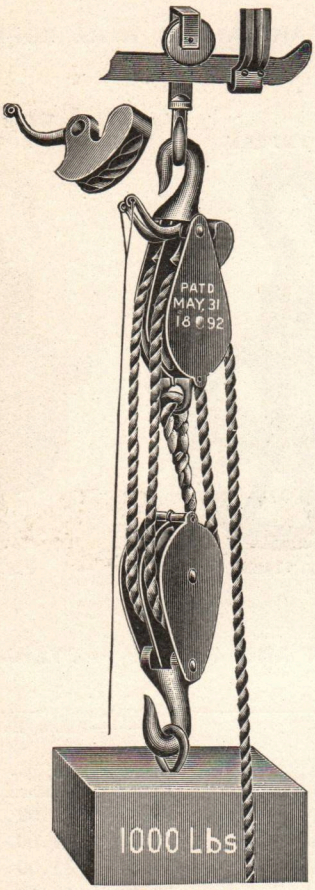


Fig. 19767A

MECHANISM

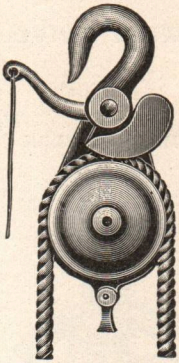


Fig. 19767B

FOUR-FOLD

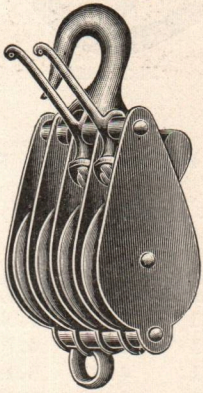


Fig. 19767C

These safety tackles are provided with double lock, as shown in the illustration, giving them great load holding efficiency, and thus making them more satisfactory than other blocks of this nature.

The principle of their construction is such that they grip the load immediately when the hoisting strain is removed.

These blocks are strongly made and it will be found that they preserve the rope for a longer period than many of the ordinary rope blocks on the market.

Sizes 1 to 6 are double blocks. Nos. 7 to 10 are four-fold.

No.	Size	For Diam. Rope, In.	Tol. Cap. Pounds	One Man Can Lift, Lbs.	Price per Set	No.	Size	For Diam. Rope, In.	Tol. Cap. Pounds	One Man Can Lift, Lbs.	Price per Set
2046	1	¼–⅜	600	300	**2.50**	2051	6	⅞–1⅛	8000	650	**15.00**
2047	2	⅜–½	1000	400	**4.00**	2052	7	½– ⅝	1700	1000	**11.00**
2048	3	½–⅝	1500	550	**6.00**	2053	8	⅝– ¾	3000	1100	**14.00**
2049	4	⅝–¾	2800	600	**9.00**	2054	9	¾– ⅞	7000	1100	**18.50**
2050	5	¾–⅞	5000	650	**12.00**	2055	10	⅞–1⅛	10000	1100	**22.00**

CHAIN

COMMON OR PROOF COIL CHAIN

Fig. 21899A

Size of Chain Inches	Approx. Links per Foot	Approx. Wt., per 100 Feet Pounds	Size of Chain Inches	Approx. Links per Foot	Approx. Wt., per 100 Feet Pounds
3/16	13½	46	5/8	6½	420
1/4	12½	75	3/4	6	590
5/16	11	110	7/8	5	800
3/8	10	155	1	4	1000
7/16	9	200	1⅛	3¾	1300
1/2	8	260	1¼	3⅜	1500
9/16	7½	325	...	...	....

BB COIL CHAIN

Fig. 21899B

Size of Chain Inches	Approx. Links per Foot	Approx. Wt., per 100 Feet Pounds	Proof Test Pounds	Approx. Breaking Strain Pounds	Size of Chain Inches	Approx. Links per Foot	Approx. Wt., per 100 Feet Pounds	Proof Test Pounds	Approx. Breaking Strain Pounds
3/16	14½	50	1100	2200	5/8	7	425	10750	23000
1/4	13½	80	1650	3800	3/4	6¼	600	15500	33500
5/16	12	115	3000	5600	7/8	5¼	820	21000	44000
3/8	11	160	4000	8000	1	4¼	1030	28500	59000
7/16	9½	210	5500	11500	1⅛	4	1350	36000	74000
1/2	8½	265	7000	15000	1¼	3½	1550	43000	86000
9/16	8	335	8800	18500	...	...	....	.....	.....

BBB COIL CHAIN

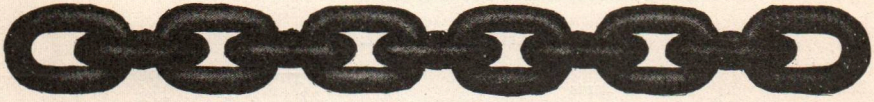


Fig. 21899C

Size of Chain Inches	Approx. Links per Foot	Approx. Wt., per 100 Feet Pounds	Proof Test Pounds	Approx. Breaking Strain Pounds	Size of Chain Inches	Approx. Links per Foot	Approx. Wt., per 100 Feet Pounds	Proof Test Pounds	Approx. Breaking Strain Pounds
3/16	15	52	1200	2400	5/8	7¼	430	12500	25000
1/4	14	83	1750	4500	3/4	6½	610	17750	35000
5/16	12½	118	3400	7000	7/8	5½	830	24000	47500
3/8	11½	166	4500	9000	1	4½	1040	31350	64500
7/16	10	215	6300	12500	1⅛	4⅛	1400	38000	78000
1/2	9	268	8000	16500	1¼	3⅝	1600	47000	95000
9/16	8¼	340	10000	22000	...	...	....	.....	.....

YALE DIFFERENTIAL BLOCKS

¼ TO 3 TONS

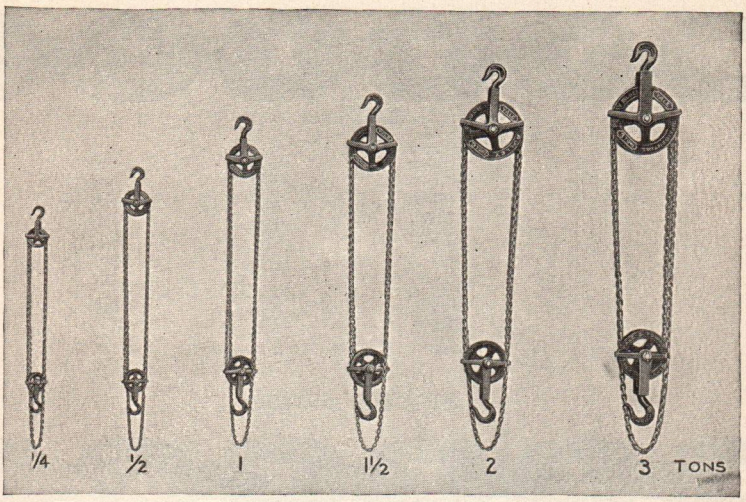


Fig. 3134A

EFFECTIVE NOVEMBER 1, 1919

Capacity Tons	Minimum Distance between Hooks, In.	Net Weight Pounds	Chain Pull Pounds	Chain Pull Feet	Regular Hoist Feet	Price Complete	Price Extra Hoist per Foot*
¼	17	23	72	18	6	**36.00**	**5.60**
½	21	30	122	24	7	**42.00**	**5.60**
1	26	50	216	30	8	**56.00**	**6.00**
1½	32	81	246	36	8½	**72.00**	**6.40**
2	39	121	308	42	9	**90.00**	**6.80**
3	44	179	557	38	9½	**120.00**	**8.00**

*Each foot of extra hoist includes 4 feet of chain.

PARTS FOR REPAIRS

No.	Name of Parts		Capacity, Tons ¼	½	1	1½	2	3
11	Top Yoke and Hook	each	**6.00**	**7.50**	**9.00**	**11.00**	**15.00**	**22.00**
12	" Sheave	"	**7.20**	**5.60**	**12.00**	**16.80**	**24.00**	**31.20**
13	Bottom Sheave	"	**.80**	**2.60**	**3.00**	**3.80**	**4.50**	**7.50**
14	" Yoke and Hook	"	**4.50**	**6.00**	**7.50**	**9.00**	**11.00**	**16.00**
15	Top Sheave Pin	"	**.80**	**1.00**	**1.00**	**1.20**	**1.20**	**1.40**
16	Bottom Sheave Pin	"	**.60**	**.80**	**.80**	**1.00**	**1.00**	**1.20**
..	Regular Chain	"	**30.80**	**36.40**	**45.00**	**52.80**	**61.20**	**76.00**

All Yale Chain Blocks receive a final test (50% overload in long tons) and inspection before shipment.

YALE SCREW-GEARED BLOCKS

½ TO 10 TONS

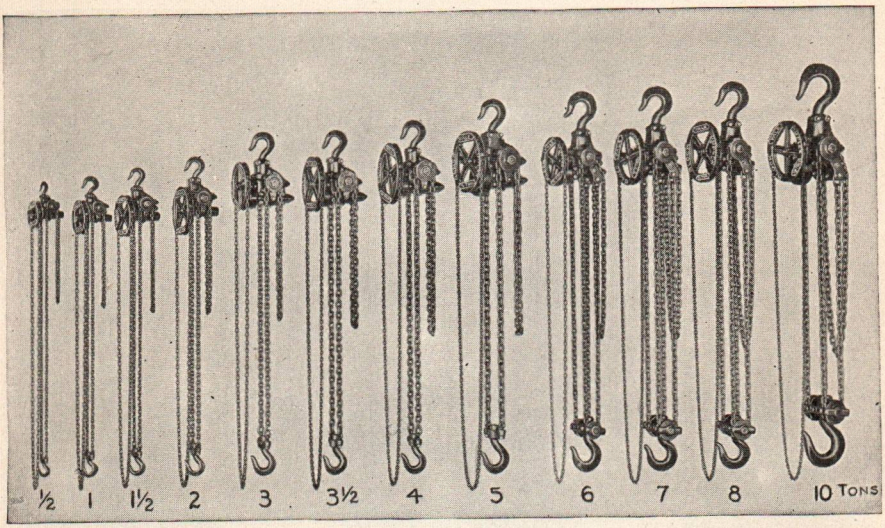


Fig. 3084A

EFFECTIVE NOVEMBER 1, 1919

Capacity Tons	Minimum Distance between Hooks Inches	Reach† Feet	Reach† Inches	Net Weight Pounds	Chain Pull‡ Pounds	Chain Pull‡ Feet	Regular Hoist Feet*	Price Complete	Price Extra Hoist per Foot
½	13	9	1	46	68	40	8	**50.00**	**2.50**
1	16	9	4	59	87	59	8	**60.00**	**2.60**
1½	19	9	7	81	94	80	8	**80.00**	**2.70**
2	21	10	9	104	115	93	9	**100.00**	**2.80**
3	25	12	1	187	132	126	10	**150.00**	**3.00**
4	29	12	5	221	142	155	10	**190.00**	**3.80**
5	31	14	7	331	145	195	12	**280.00**	**4.00**
6	33	14	9	310	145	252	12	**360.00**	**5.60**
8	36	15	..	416	160	310	12	**420.00**	**6.00**
10	45	15	9	578	160	390	12	**550.00**	**6.40**

*Figures denote height in feet which blocks, with regular lengths of chain, will hoist from level on which operator stands. Extra lengths of chain should be ordered when it is desired to hoist higher. No deduction is made for blocks with less than the regular length of chain.

†The reach is the sum of the hoist and the minimum distance between hooks. When hung at this height, to lift the full hoist above the floor, the hand chain of spur-geared and screw-geared blocks hangs down to within 18 inches of floor.

‡Figures denote the pull in pounds required to lift the full load, and the number of feet of hand chain which must be handled to lift the load 1 foot.

All Yale Chain Blocks receive a final test (50% overload in long tons) and inspection before shipment.

YALE SCREW-GEARED BLOCKS

PARTS, ½ TO 5 TONS

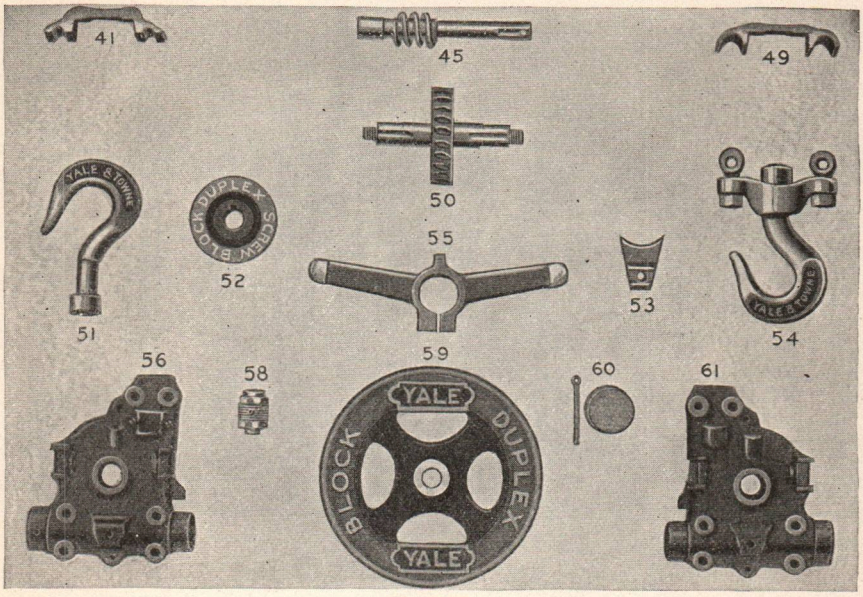


Fig. 672A

EFFECTIVE NOVEMBER 1, 1919

No.	Name of Parts		½-ton	1-ton	1½-ton	2-ton	3-ton	3½-ton	4-ton	5-ton
41	Load Chain Guide	each	.80	1.00	1.20	1.40	2.00	2.40	2.80	3.20
45	Worm and Shaft	"	6.00	7.00	8.00	9.00	10.00	12.00	14.00	20.00
49	Load Chain Guard	"	.60	.80	1.00	1.20	1.40	1.60	1.80	2.00
50	Worm Wheel	"	7.00	8.00	10.00	12.00	14.00	18.00	22.00	30.00
51	Top Hook and Nut	"	2.00	2.80	3.60	4.80	6.00	8.00	10.00	12.00
52	Load Sheave	per pair	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
53	Strippers	"	.60	.80	1.00	1.20	1.40	1.60	1.80	2.00
54	Bottom Hook Swivel and Eye-bolts	each	4.00	5.00	6.00	7.00	9.00	10.00	12.00	16.00
55	Hand Chain Guide	"	1.80	2.00	2.60	3.60	4.00	4.80	5.20	5.60
56, 61	Housing	"	5.00	6.00	8.00	10.00	12.00	14.00	20.00	30.00
58	Friction Plug	"	2.40	2.80	3.40	4.00	....	....	....	.....
59	Hand Wheel (See Note Below)	"	3.00	3.20	5.00	6.00	7.00	8.00	9.00	10.00
60	Friction Plug Cover	"	.60	.60	.80	1.00	....	....	....	....
72	Pinion Shaft	"	....	....	....	....	8.00	8.40	8.80	9.20
74	Gear	"	....	....	....	....	3.20	3.60	4.00	4.40
91	Friction Plug Cover	"	....	....	....	....	1.00	1.00	1.00	1.00
92	" "	"	....	....	....	....	5.00	6.00	7.00	8.00
..	Hand Chain Steel	per foot	.50	.50	.50	.50	.50	.80	.80	.80
..	Load "	"	.75	.80	.85	.90	1.00	1.10	1.10	1.20

In ordering handwheels or hand chain note number of pockets for chain links in rim of wheel.

Welded hand chain for old model blocks, 37½ per foot for ½, 1, 1½ and 2-ton sizes.

YALE SCREW-GEARED HOISTS

PARTS 6 TO 10 TONS

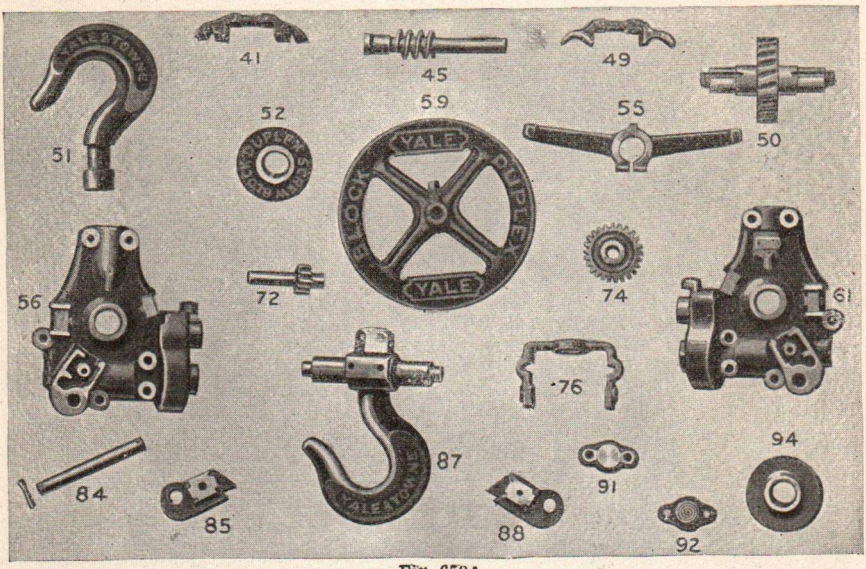


Fig. 659A

EFFECTIVE NOVEMBER 1, 1919

No.	Name of Parts		6-ton	7-ton	8-ton	10-ton
41	Load Chain Guide	each	3.40	3.60	3.80	5.00
45	Worm and Shaft	"	24.00	32.00	36 00	44.00
49	Load Chain and Guard	"	2.20	2.40	2.60	2.80
50	Worm Wheel	"	32.00	36.00	40.00	50.00
51	Top Hook	"	14.00	16.00	24.00	30.00
52	Load Sheave	per pair	11.00	12.00	16.00	18.00
55	Hand Chain Guides	each	6.00	6.00	6.00	8.00
56 & 61	Housing	each half	32.00	36.00	40.00	60.00
59	Handwheel	each	10.00	10.00	13.00	14.00
72	Pinion Shaft	"	9.60	10.00	10.40	12.00
74	Gear	"	4.60	4.80	5.00	6.00
76	Bottom Guides	per pair	9.00	10.00	12.00	14.00
84	Clevis Pin	each	1.00	1.20	1.40	2.00
85 & 88	Strippers	per pair	3.00	4.00	5.00	7.00
87	Bottom Hook and Crosshead	each	24.00	32.00	40.00	50.00
91	Friction Plug Cover	"	1.00	1.00	1.20	1.20
92	" " "	"	8.40	8.80	9.20	10.80
94	Bottom Sheaves	per pair	6.00	8.00	12.00	14.00
..	Load Chain	per foot	1.00	1.10	1.10	1.20
..	Hand " Steel	"	.80	.80	.80	.80

Nos. 72, 74, 91 and 92 in above illustration are also used in the 3, 3½, 4 and 5-ton sizes.

YALE SPUR-GEARED BLOCKS

FROM HOOK TO HOOK A LINE OF STEEL, ¼ TO 20 TONS

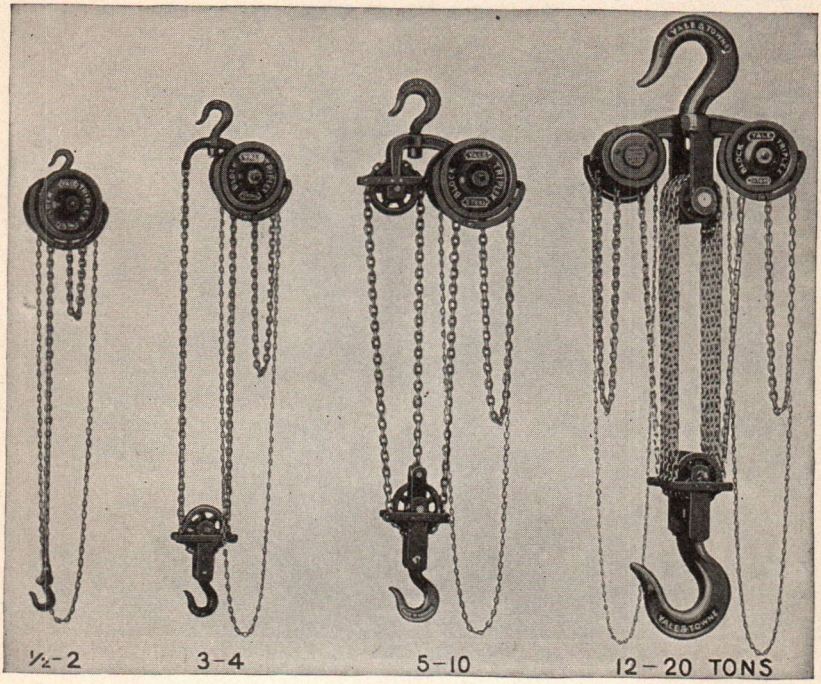


Fig. 3139A

EFFECTIVE NOVEMBER 1, 1919

These blocks (½ to 20 tons) are standardized so that all sizes are made up of the parts of the ½, 1, 1½, and 2-ton blocks. The parts of the 2-ton block fit the 4-ton block and all sizes above. A Yale Quick Speed Block with special gearing is made in two sizes: ¼-ton, 35.00; ½-ton, 45.00. They handle light loads at double speed, but require double chain pull. For easy lifting the regular Yale Spur-geared Blocks are better.

Capacity in Tons	Reach Feet	Reach Inches	Minimum Distance Between Hooks, In.	Net Weight in Pounds	Chain Pull in Pounds to Lift Full Load	Feet of Chain Handled to Lift Load 1 Foot	Regular Hoist in Feet*	Price Complete	Price Extra Hoist per Foot
¼	9	1	13	58	78	8	8	**70.00**	**1.80**
½	9	1	13	58	62	21	8	**70.00**	**1.80**
1	9	4	16	92	82	31	8	**90.00**	**1.90**
1½	9	6	18	132	110	35	8	**120.00**	**2.00**
2	10	9	21	202	120	42	9	**140.00**	**2.10**
3	12	8	32	209	114	70	10	**180.00**	**3.00**
4	13	1	37	299	124	84	10	**220.00**	**3.20**
5	15	9	45	411	110	126	12	**280.00**	**4.30**
6	15	10	46	411	130	126	12	**330.00**	**4.30**
8	16	1	49	500	135	168	12	**400.00**	**5.40**
10	16	6	54	610	140	210	12	**480.00**	**6.50**
12	16	6	54	855	130†	126†	12	**600.00**	**8.60**
16	17	2	62	1041	135†	168†	12	**920.00**	**10.80**
20	17	10	70	1350	140†	210†	12	**850.00**	**13.00**

* Figures denote height in feet which blocks, with regular lengths of chain, will hoist above level on which operator stands. †For each hand chain.

Yale Chain Blocks receive a final test (50% overload in long tons) before shipment.

YALE SPUR-GEARED BLOCKS

PARTS

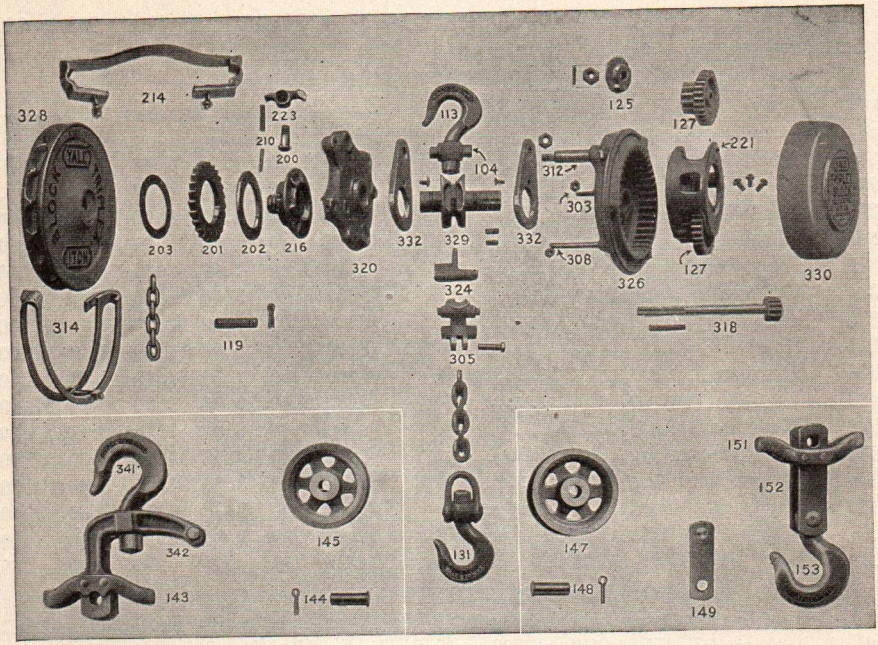


Fig. 675A

In ordering, state whether for 1898 Model or Model S. S. Parts 104 to 223 are the same in both models.

EFFECTIVE NOVEMBER 1, 1919

Number of Part	Description		For Hoist, Capacity, Tons ½	1	1½	2	3	4 to 20
104	Top Crosshead	each	2.00	2.80	4.00	4.80	....	....
113	" Hook and Nut	"	2.00	2.80	3.60	4.00	....	....
119	Gear and Pinion Pins	"	*.80	1.20	1.40	1.60	1.40	1.60
125	Check Washer	"	.80	1.00	1.40	1.80	1.40	1.80
127	Gear and Pinions	"	*1.60	2.20	2.80	3.60	2.80	3.20
131	Lower Swivel Hook	"	3.00	4.60	6.40	11.00	....	....
200	Pawl Stud	"	.80	.80	1.00	1.00	1.00	1.00
201	Ratchet Disc	"	1.60	2.00	2.80	3.00	2.80	3.00
202	Leather "	"	.80	.80	1.00	1.20	1.00	1.20
203	Galvanized Iron Disc	"	.80	.80	1.00	1.20	1.00	1.20
210	Pawl Spring	"	.40	.40	.60	.60	.60	.60
214	Strap Hand Chain Guide	"	1.50	2.40	3.00	3.60	3.00	3.60
216	Disc Hub	"	3.60	4.60	6.40	8.40	6.40	8.40
221	Pinion Cage	"	*3.20	4.20	6.40	8.40	6.40	8.40
223	Pawl	"	.40	.40	.60	.60	.60	.60

* Parts should be specified "Quick Speed" for blocks so marked on the gear cover. In ordering load chains, specify whether or not hook is required. Always give size of block. Part 221 is a driven fit. In assembling, see that the locating holes in No. 127 line up at the center.

YALE SPUR-GEARED BLOCKS

PARTS

In ordering parts, state whether for 1898 Model or Model S. S. Parts 303 to 332 differ in both models.

EFFECTIVE NOVEMBER 1, 1919

Number of Part	Description	For Hoists, Capacity, Tons ½	1	1½	2	3	4 to 20
303	Small Separator.....each	.80	1.00	1.20	1.40	1.20	1.40
304	Top Cross Head..... "	2.00	2.80	4.00	4.80	....	....
305	Load Chain Guide..... "	.60	.60	.80	1.00	.80	1.00
308	" " " Bolt..... "	.40	.40	.60	.80	.60	.80
312	Large Separator..... "	1.20	1.40	1.60	2.00	1.60	2.00
314	Continuous Hand Chain Guide... "	3.00	4.00	5.00	6.00	5.00	6.00
318	Driving Pinion..... "	*6.00	8.00	10.00	12.00	10.00	12.00
320	Ratchet Case..... "	5.00	7.00	9.00	11.00	9.00	11.00
324	Stripper..... "	.60	.80	1.00	1.00	1.00	1.00
326	Internal Gear..... "	4.80	6.40	10.00	6.00	10.00	12.00
328	Handwheel..... "	*3.60	4.60	6.00	7.20	6.00	7.20
329	Load Sheave..... "	4.00	6.40	9.50	12.70	9.50	12.70
330	Gear Cover..... "	2.20	3.00	3.60	4.20	3.60	4.20
332	Suspension Plate..... "	3.00	4.00	5.00	6.00	5.00	6.00
...	†Steel Load Chain.....per foot	.80	.90	1.00	1.10	1.00	1.10
...	" Hand " ..... "	.50	.50	.50	.50	.50	.50

FOR BLOCKS 3 TONS AND LARGER

In ordering parts, state whether for 1898 Model or Model S. S. Parts 341 and 342 differ in both models. Parts 143 to 153 are interchangeable in both models. No. 341—Top Hook. No. 342—Top Yoke. No. 143—Top Guard and Guides. No. 144—Top Sheave Pin. No. 145—Top Sheaves. No. 147—Bottom Sheave. No. 148—Bottom Sheave Pin. No. 149—Becket Straps. No. 151—Bottom Guards and Guides. No. 152—Bottom Side Plates and Crosshead. No. 153—Bottom Hook.

EFFECTIVE NOVEMBER 1, 1919

Number of Part	For Hoists, Capacity, Tons 3	4	5	6	8	10	12	16	20
341	6.00	10.00	12.00	14.00	24.00	30.00	48.00	64.00	130.00
342	12.70	28.60	33.20	40.00	50.00	56.00	64.00	80.00	128.00
143	....	....	9.60	14.00	16.00	18.00	20.00	23.00	26.00
144	....	....	2.00	3.00	4.00	5.00	7.00	8.00	11.00
145	....	....	6.00	9.00	10.00	11.00	11.00	11.00	11.00
147	6.00	9.00	9.00	12.00	12.00	14.00	14.00	14.00	14.00
148	1.60	2.60	3.00	4.00	5.00	6.00	8.00	10.00	13.00
149	....	....	8.00	12.00	14.00	16.00	.....	.....	.....
151	7.00	8.00	10.00	14.00	16.00	20.00	24.00	27.00	31.00
152	6.40	10.00	14.00	18.00	22.00	26.00	38.00	48.00	32.00
153	6.00	10.00	12.00	14.00	24.00	30.00	48.00	64.00	130.00

* Parts should be specified Quick Speed for blocks so marked on the gear cover. †In ordering load chains, specify whether or not hook is required, always give size of block. Part 329 is a driven fit.

YALE SPUR-GEARED BLOCKS AND BROWN-HOIST TROLLEYS

TROLLEY AND YALE SPUR-GEARED BLOCK WITH CLEVIS CONNECTION 3 TO 4 TONS

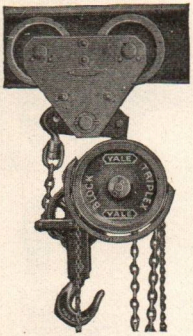


Fig. 666A

ARMY TYPE YALE SPUR-GEARED TROLLEY BLOCK

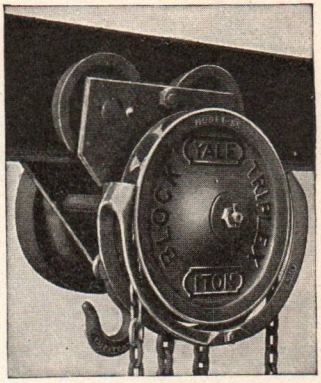


Fig. 666B

EFFECTIVE NOVEMBER 1, 1919

TROLLEYS AND YALE SPUR-GEARED BLOCKS WITH CLEVIS CONNECTION

Capacity Tons	Standard Sizes I-Beam Inches	Regular Hoist Feet*	Minimum Distance from Bottom of I-Beam to Inside of Lower Hook Inches	Price, Each: With Plain Trolley	Price, Each: With Geared Trolley
½	5	8	14	**110.00**	.....
1	6	8	18	**140.00**	**180.00**
1½	7	8	21	**180.00**	**220.00**
2	8	9	22	**210.00**	**250.00**
3	9	10	34½	**260.00**	**300.00**
4	10	10	38½	**320.00**	**360.00**
5	12	12	42	**410.00**	**460.00**
6	15	12	43	**490.00**	**530.00**
8	20	12	48	**590.00**	**620.00**
10	24	12	49	**700.00**	**740.00**

*For price of extra hoist with plain trolley, see Yale Spur-geared Block. Extra hoist with geared trolley, same price as extra hoist for Yale Spur-geared Blocks, plus 50 cents per foot.

ARMY TYPE YALE SPUR-GEARED TROLLEY BLOCKS

EFFECTIVE NOVEMBER 1, 1919

For working close to ceilings.

Capacity Tons	Size I-Beam Inches	Minimum Distance between Hook and I-Beam Inches	Extreme Width Inches	Net Weight Pounds	Price Complete Each	Hoist Feet*	Price Extra Hoist per Foot
½	½	8½	12¾	105	**126.00**	8	**1.80**
1	6	10½	14¼	168	**150.00**	8	**1.90**
1½	7	12	16⅜	210	**200.00**	8	**2.00**
2	8	15	18½	280	**240.00**	9	**2.10**
3	9	24	17⅝	385	**340.00**	10	**3.00**
4	10	27½	19¾	530	**380.00**	10	**3.20**

*The hoist is the travel of hook from the floor to the highest point. The greatest height to the bottom of the I-beam for which this hoist is suitable is the sum of the hoist and minimum distance between hook and I-beam; at this height the hand chain hangs down within 18 inches of the floor. Additional price for widening to suit larger beams, 15.00. Triplex trolley blocks are too wide to pass the regular switches, but special switches can be furnished, if required.

YALE ELECTRIC HOISTS

1 AND 2-TON

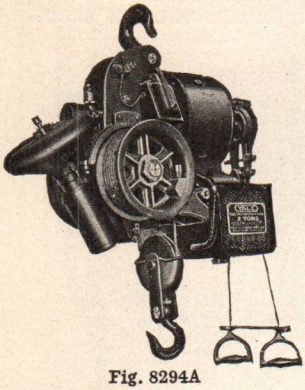


Fig. 8294A

4-TON

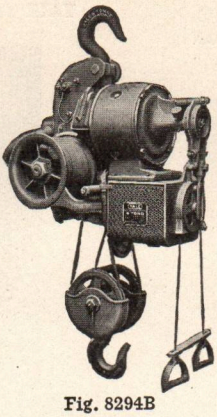


Fig. 8294B

5-TON

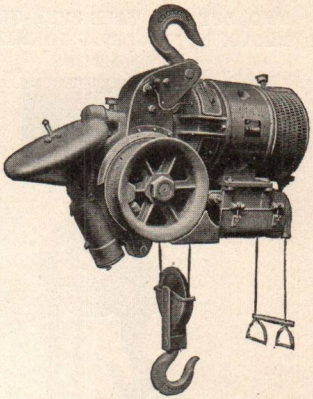


Fig. 8294C

6-TON

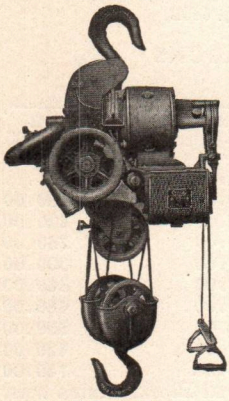


Fig. 8294D

Both direct and alternating current hoists can be supplied, direct current being best for variable speed service. Inquiries and orders should specify the tonnage, height of lift and voltage of the electric supply. If for alternating, state phase and cycles.

Capacity.....tons	1	2	4	5	6	10
Regular Hoist.....feet	15	15	15	15	10	15
Minimum distance between hooks..*inches	52	52	57	74	67	81
Speed per minute						
Loaded.....*feet	20	15	8	16	5	8
Light..... "	38	38	20	40	6	20
Weight.....*pounds	640	640	800	1740	900	2100
Motor.....H.P.	3	3	3	7	3	7

*Data given is for direct current hoists.

Prices on application.

Extra lifts at 40.00 extra can be supplied for 1, 2 and 5-ton up to 45 feet, 4 and 10-ton up to 22 feet, and 6-ton up to 15 feet.

Foundry controller, 150.00 extra.

TRIPLEX ELECTRIC HOISTS

This hoist takes the place of a chain block at moderate additional cost, and gives from five to ten times the speed. Where any quantity of material from 50 to 4000 pounds has to be repeatedly lifted and lowered, as in serving machine tools, this is the hoist to use. It is well adapted for use on trolley tracks, for attachment to small traveling cranes, or for lashing to shear poles.

It is a compact and simple power hoist made up of the regular Yale Triplex Block with a motor attached. The 1-ton Yale Electric Triplex Hoist is made up of the 2-ton block and the ½-ton Yale Electric Triplex Hoist is made up of the 1-ton block.

Capacity.....tons	½	1	2
Minimum Distance between Hooks.....inches	20	25	32
Weight.....pounds	250	370	425

Prices upon application.

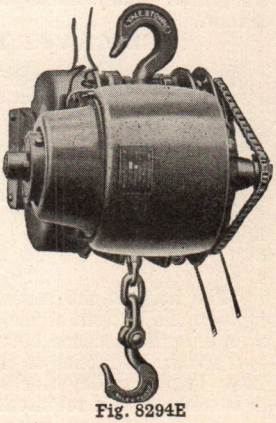


Fig. 8294E

BROWNHOIST TROLLEYS

STEEL TROLLEYS

PLAIN

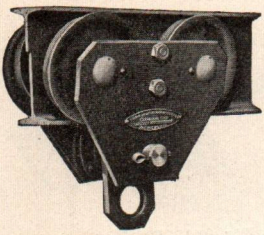


Fig. 5524A

GEARED

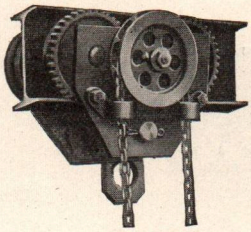


Fig. 5524B

FLAT RAIL TROLLEY

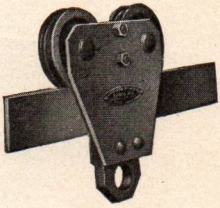


Fig. 5524C

STEEL TROLLEYS

Each wheel has an axle which is pressed in, causing them to turn as one unit.

EFFECTIVE NOVEMBER 1, 1919

Cap. Tons	Diam. of Tread of Wheels Inches Plain	Geared	Standard Size of I-Beam Inches	Smallest Radius for I-Beam Curve, Inches Plain	Geared	Greatest Distance between Support Feet	Weight, Pounds Plain	Geared	Price, Each Plain	Geared
¼	3	..	4	18	..	10	25	...	**28.00**	.....
½	3¾	..	5	21	..	13	30	...	**32.00**	.....
1	4¾	4¾	6	21	21	14	50	90	**40.00**	**80.00**
1½	5½	5½	7	30	30	14	95	140	**50.00**	**90.00**
2	6½	6½	8	36	36	15	115	170	**60.00**	**100.00**
3	7¼	7¼	9	42	42	15	150	180	**80.00**	**120.00**
4	8¼	8¼	10	48	48	15	210	350	**100.00**	**140.00**
5	10	10	12	54	54	17	270	360	**120.00**	**180.00**
6	10	10	15	60	60	21	350	460	**160.00**	**200.00**
8	12	12	20	60	60	28	420	540	**190.00**	**220.00**
10	13	13	24	60	60	32	550	650	**220.00**	**260.00**
12	13	13	24	60	60	29	600	700	**220.00**	**260.00**
15	18	18	24	96	96	26	1100	1400	**360.00**	**440.00**
20	18	18	24	120	120	21	1200	1500	**400.00**	**500.00**

These trolleys are regularly furnished with pins and washers, enabling them to be widened for the next two larger size I-beams than standard. 5-ton can be widened for 15–18-inch beams.

Factory shipment can be made of trolleys for larger size I-beams.

FLAT RAIL TROLLEYS

Geared trolleys are fitted with hand chain and sprocket wheel for trolley travel.

EFFECTIVE NOVEMBER 1, 1919

Capacity.....tons	¼	½	1	1½	2	3	4
Size of Rail.....inches	3x½	3x½	4x¾	4x¾	4x¾	6x1	6x1
Distance between Hangers..ft.	6	5	6	5	4	6	5
Price, Plain.....each	**18.00**	**18.00**	**30.00**	**30.00**	**30.00**	**60.00**	**60.00**
" Geared..... "	.....	.....	**70.00**	**70.00**	**70.00**	**100.00**	**100.00**

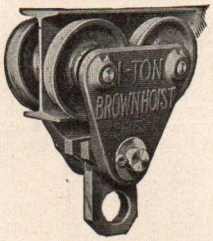


Fig. 5524D

CAST IRON TROLLEYS

EFFECTIVE NOVEMBER 1, 1919

Cap. Tons	Size of I-Beam Inches	Weight I-Beam Pounds	Price, Each Plain	Roller-bearing
¼	4	7½	**14.00**	.....
½	5	9¾	**16.00**	.....
1	6	12¼	**21.00**	**35.00**
1½	7	15	**27.00**	**44.00**
2	8	18	**34.00**	**55.00**

These trolleys can be widened for larger I-beams.

COLUMBUS TUBULAR STEEL WHEELBARROWS

ALL STEEL

No. 4

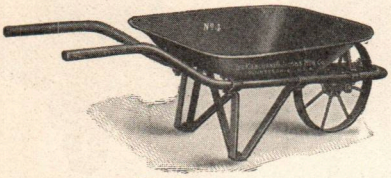


Fig. 25494A

Columbus tubular steel barrows, Nos. 4, 5, 10 and A-X, now comprise the complete variety of steel wheel barrows and provide a suitable type for all purposes and conditions. They all have tubular steel handles, in one piece, forming a wheel-guard or dumping rest.

No. 5

Fig. z5494B

They have steel stamped trays with rod-stiffened edges and all are equipped Lewis pattern steel wheels. Painted blue throughout, except wheel; wheel is painted black. In the point of strength there can be, of course, no wheelbarrow superior to an all-steel barrow.

No. 10

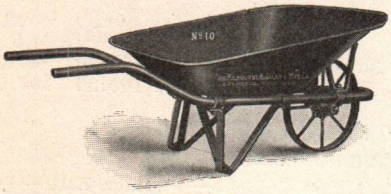


Fig. 25494C

This type also may be adapted to a wider range of uses than any other, being practically required for the handling of hot material such as castings, cinders and ashes, also being highly desirable for wheeling ore and metal, and handling concrete and gravel in street work.

No. A-X

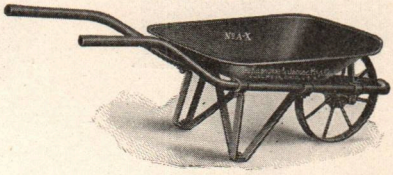
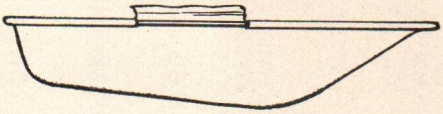


Fig. 25494D

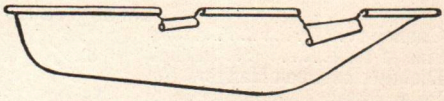
The steel axle clip used on this type is a special design adapted particularly to re-enforcing the tubular handles about which it is snugly fitted and bolted.

SHOWING HOW ALL K. & J. STEEL TRAYS ARE RE-ENFORCED AT EDGES BY STEEL ROD



All K. & J. steel trays are made with steel rod beaded in edges to stiffen the tray and prevent edges from breaking. A tray edge when rolled without the rod usually has the same appearance, when new, as the strong rod-beaded edge.

SHOWING HOW TRAY EDGES NOT SO RE-ENFORCED SOON GIVE AWAY



A glance at the illustration, however, shows why it pays to be sure that all trays bought should have the edge rodded.

No.	Capacity Cubic Feet	Size on Top, Inches Length	Width	Size No. of Wheel	Weight Pounds
4	3	32	29	14	71
5	4	35½	28½	14	78
10	6	41½	33	15	103
A-x	3	30¾	25	13-A	61

Prices upon application.

EASY RUNNING CONCRETE WHEELBARROWS

COLUMBUS

Fig. 26232A

These barrows are all provided with channel iron legs, steel braced, legs being shod with bar steel. Also with specially shaped wheel guard or dumping rest. Painted blue; wheel, black, wooden parts not painted.

The barrow shown in the above illustration is a side-dumping type, the square tray corners at front forming a pouring channel at each side. Tray braces at front are continuous and bear against the tray front in a wide semi-circle.

Prices upon application.

No. 2B

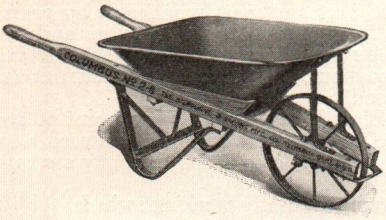


Fig. 26232B

Used in street work and for general purpose use in connection with concrete. Has stamped steel tray.

Also has tray risers, which place the tray practically level when the barrow is being wheeled, adapting it to the handling of batch and similar fluid material and at the same time making it the easiest possible barrow to handle, since the wheel is put back under the tray.

Having the steel axle clips, steel wheel guard, and the same underframe construction referred to more fully above, this wheelbarrow will be found satisfactory in every respect.

Prices upon application.

CONCRETE CARTS

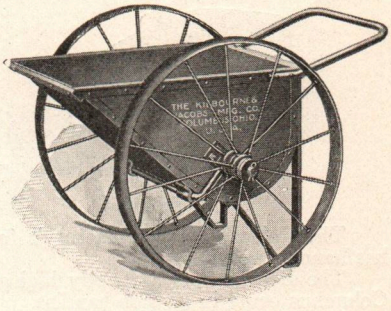


Fig. 26232C

Note the sharp angle of dump of the concrete cart; also the re-enforcement of lip, especially important when dumping into molds; the round easily gripped bar handles, and the fact that the bowl is not obstructed by the axle.

Wheels of exceptionally large diameter assure the easy pushing of capacity loads, while the crown face of the tires provide for easy turning on soft ground, or on plank runways where a flat-faced tire is apt to grind.

IN DUMPING POSITION

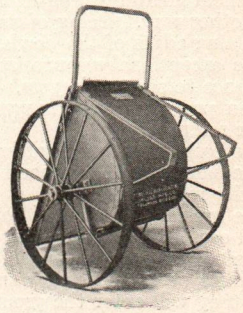


Fig. 26232D

The good balance of the bowl is a point quickly noticed in handling the cart. The bowl is pivoted just in front of the center of the load, and the cart is easily dumped.

The large capacity bowl is unobstructed by the axle. The axle of heavy round bar steel, is bent around the bottom of the bowl, affording a strong bowl support.

Prices upon application.

EASY FILLING DRAG SCRAPERS

COLUMBUS

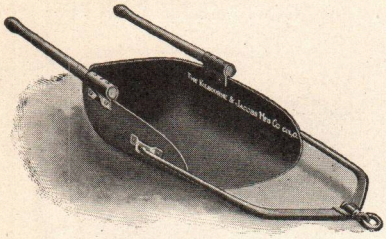


Fig. 1375A

BOSS

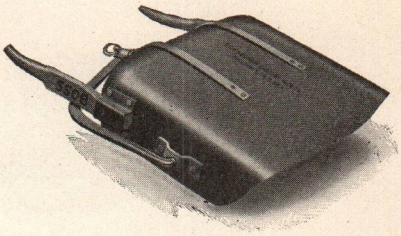


Fig. 1375B

The Columbus is the factory's first grade and the finest they produce. This type has handles on top.

The Boss is also a strictly high-grade product, its chief design difference from the Columbus being in its side handles.

The Columbus and Boss are made in three sizes, as shown in the table below, and with either plain bottom or with runners.

OX SHOVEL

Fig. 1375C

Ox shovels are manufactured for the heaviest class of work, such as ditching, drawn by locomotive, earth moving by cable haulage and similar service. The design is similar to the Columbus, having top handles. They are supplied with plain bottoms or with runners.

Each of these scrapers is stamped from a single sheet of extra hard steel plate and is of seamless construction throughout.

The special shape of these K. & J. drag scrapers is one which has been proved the best and most practicable by years of use. They are made with one continuous curve from the center up the sides and back, giving them greater strength in proportion to their large capacities than can be obtained in any other way. Being of uniform width throughout, they fill with minimum draft.

Cutting edges of the bowls are suitably ground.

The exceptional wear-resisting hardness of K. & J. scraper plate is a point of great importance to scraper buyers. A specially rolled, high-carbon, steel plate is used, which has been proved to give longer wear under the roughest conditions than any steel used in other scrapers.

The bails are of steel, of improved pattern, with perfectly working swivels.

The handles will commend themselves to every scraper user, as they are extra strong and easily replaceable.

The special K. & J. bail ear admits of easily removing the bail without removing the bail ear, as is necessary with all other scrapers.

The special construction of K. & J. drag scrapers, both in point of shape and material, admits of their being worked economically in any kind of soil, whether plowed or not, as they will enter the ground very readily.

Brand	No.	Capacity Cubic Feet	Size of Bowl, Inches: Top of Back to Cutting Edge	Width	Greatest Depth	Approx. Weight, Lbs.: Plain	With Runners
Columbus	1	7	34	33	10	98	105
"	2	5	31½	29½	9½	90	97
"	3	3	32	26	9½	75	82
Boss	1	7	34	33	10	88	95
"	2	5	31½	29½	9½	80	87
"	3	3	32	26	9½	70	77
Ox Shovel	0	10	34	35	11½	124	135

Prices upon application.

TELSMITH PORTABLE CRUSHERS

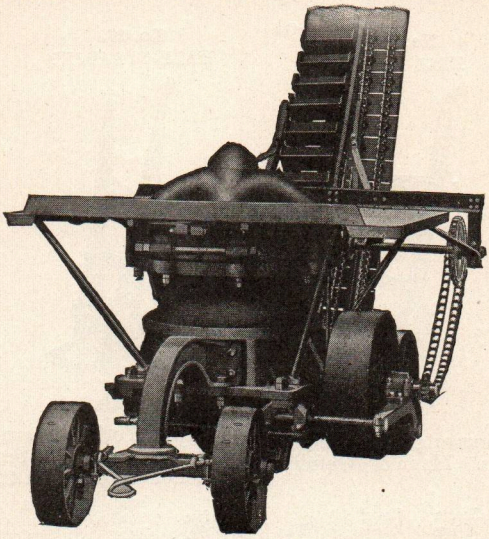


Fig. 24076A

In a portable outfit, the short massive frame of these crushers is an immense advantage. The reduction in height carries with it two advantages of great value in a mounted rig: (1) low feed level and (2) reduced weight. The weight and height is not saved by paring down metal or close designing. With the shaft rigid and the eccentric inside the head, the frame shortens itself and the reduction in weight follows inevitably.

Each crusher is furnished with a ¼-inch steel platform which is re-enforced with heavy angles. This platform is big enough to accommodate the full loading crew.

The all steel elevator, furnished with Telsmith portable rigs, is of the pivoted type, with a telescopic bottom section. The side frames of the elevator are heavy steel channels, with adequate bracing. There are no wood members in the frame. All elevator drives are chain —no belts. The whole elevator is rigid and substantial.

The elevator buckets are big and heavy, built to handle large capacities.

TABLE OF SIZES

Number of Crusher	3	4	5
Size of Each Receiving Opening ... inches	7x37	8x41	10x48
" " Combined Receiving Openings ... "	7x74	8x82	10x96
Capacity per hour:			
With 1 -inch Discharge Opening ... cu. yds.	10–12	....	....
" 1¼ " " " ... "	12–14	18–20	....
" 1½ " " " ... "	14–16	20–22	25–29
" 1¾ " " " ... "	16–18	22–24	29–33
" 2 " " " ... "	....	24–26	33–37
" 2½ " " " ... "	....	....	37–41
Horse Power Recommended for Complete Outfit Crushing Limestone Under Normal Conditions	20	25	30
Size of Driving Pulley ... inches	32x10	36x12	42x12
Speed of " " ... r. p. m.	375	365	354
Size of Front Wheels ... inches	26x 8x¾	26x 8x¾	34x 8x¾
" " Rear " ... "	34x10x¾	34x10x¾	44x12x¾
" " Elevator Buckets ... "	12x 4x9	14x 5x9	18x 5x 9
Weight (Approx.) of Mounted Crusher, with 25-foot Elevator ... pounds	17000	22000	29500

Prices upon application.

TRUCKS

No. 200
HALF IRONED

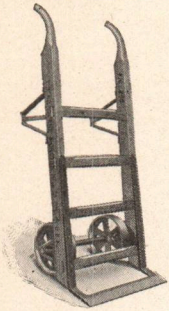


Fig. 25741A

No. 201
FULL IRONED

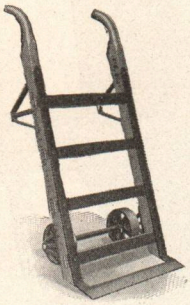


Fig. 25741B

For railroads, warehouses, packing houses and similar industries. Made of carefully selected materials.

Size No.	Length of Handles Inches	Greatest Width Inches	Length of Nose Inches	Size of Wheels Inches	*Wt. Lbs.
1	48	20⅝	5	7x2	47
2	52	20⅝	5	8x2½	55
3	56	24¾	5	8x2½	80
4	60	24¾	6	11x2½	107

*Half ironed.

WITH TWO CENTER STRAPS

No. 202

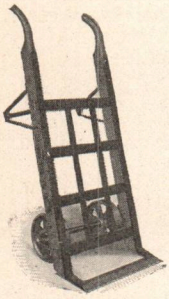


Fig. 25741C

No. 203

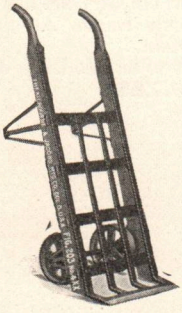


Fig. 25741D

No. 202 is similar in construction to No. 201, No. 4, but with the addition of two center straps.

No. 203 is an extra heavy truck with center straps welded to nose.

202	60	24¾	6	11x2½	118
203	60	24¾	6	11x2½	125

Prices upon application.

No. 272
HALF STRAPPED

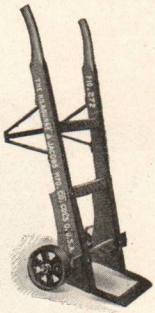


Fig. 25741E

No. 272A
FULL STRAPPED

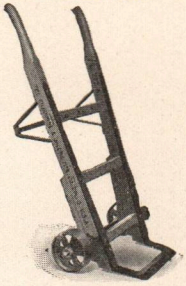


Fig. 25741F

New York pattern trucks for stores and warehouse. Similar to but more economical in price than Boston.

Size No.	Length of Handles Inches	Greatest Width Inches	Length of Nose Inches	Size of Wheels Inches	*Wt. Lbs.
1	48	20	5	7x2	45
2	52	22½	6	8x2½	57
3	56	25¼	7	8x2½	72
4	64	26½	7	†10x2½	84

*Half strapped. †Rubber and fiber tired wheels on No. 4 are 11-inch diameter.

No. 207
FULL IRONED

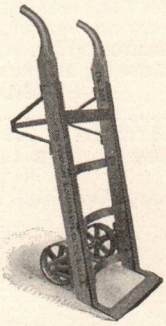


Fig. 25741G

No. 207-4
CURVED BARS

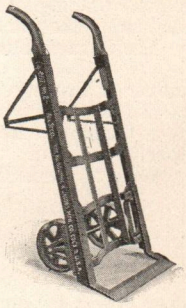


Fig. 25741H

Barrel trucks with lower crossbars for handling barrels. Top crossbar is wood, ironed on top and is straight.

1	48	20⅝	5	7x2	50
2	52	20⅝	5	8x2½	63
3	56	24¾	5	8x2½	90
4	60	24¾	6	11x2½	114

Prices upon application.

TRUCKS, DOLLIES AND SKIDS

BOX TRUCKS

No. 223

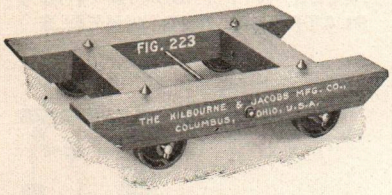


Fig. 25743A

The standard type of box truck for handling large, heavy cases. A much improved type.

No. 224

Fig. 25743B

Has center wheels so placed that load may be balanced in turning. Center axle bears on heavy steel wearing plate.

Style No.	Size No.	Dimensions, Inches Length	Width	Height	Wheels Inches	Wt. Lbs.
223	1	18	18¾	5 3/16	4x1⅜	27
223	2	26	18¾	5 3/16	4x1⅜	32
224	3	24	17¼	6 15/16	4x1⅜	43
224	4	36	20	6 15/16	4x1⅜	50

The trucks illustrated above have spur head bolts on top to keep box from slipping.

Prices upon application.

TRIANGULAR BOX TRUCKS

A convenient truck for handling a barrel in an upright position, a box or stove etc., through the smallest space.

Martin's Patent Double Casters.

Frame varnished, wheels black.

Frame Length from Point to Point Inches	Frame Height from Floor Inches	Size Material in Frame Inches	Size Caster Wheels Inches	Approx. Weight Pounds
30	5⅛	3½x1	3⅛x¾	16

DOLLIES

Nos. 1 AND 2

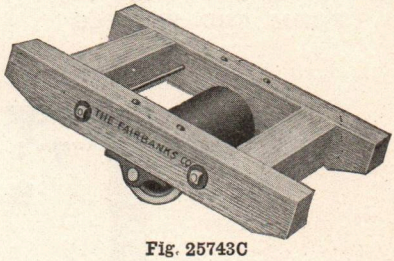


Fig. 25743C

Made with a flat faced cast iron roller which is the regular type. Can be used as a truck or inverted and used as a roller.

No. 3

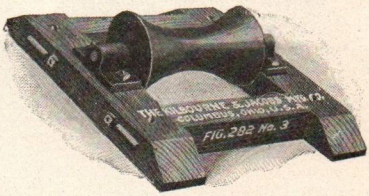


Fig. 25743D

With concave roller. Especially suited for handling rails and structural steel.

Size No.	Lgth. In.	Width In.	Ht. In.	Rollers Inches	Wt. Lbs.
1	24	17¼	7	9¼x6	58
2	24	20	7	12x6	65
3	24	20	7½	*12x7	77

*3¼-inch centers.

Prices upon application.

SKIDS

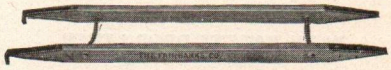


Fig. 25743E

All of heavy pattern.

Length Feet	Side Rail Inches	No. of Cross Bars	Weight Pounds
6	1¾x3½	2	40
8	1¾x3¾	2	55
10	1¾x4	3	65

Prices upon application.

HOWE SCALES

PORTABLE SQUARE PLATFORM SCALES WITH PANEL PLATFORM AND WHEELS

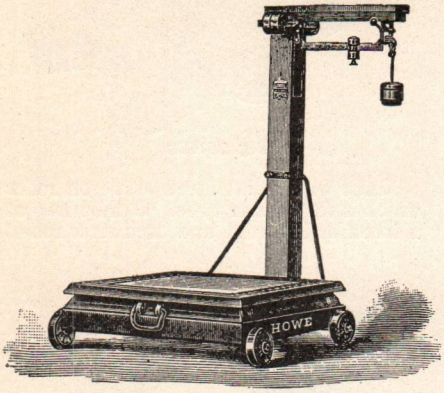


Fig. 25991A

No.	Capacity Pounds	Size of Platform Inches	Price Each
844	2500x½	34x34	**133.00**
846	2000x½	32x32	**118.00**
848	1500x½	30x30	**88.00**
852	1000x½	26x26	**67.00**
856	500x¼	24x24	**52.00**

PORTABLE SQUARE PLATFORM SCALES WITH SOLID IRON PLATFORM AND WHEELS

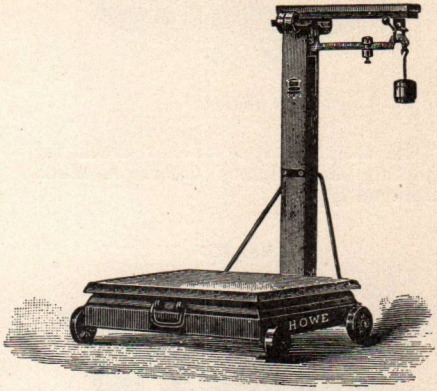


Fig. 25991B

No.	Capacity Pounds	Size of Platform Inches	Price Each
820	2000x½	32x32	**123.00**
822	1500x½	30x30	**93.00**
826	1000x½	26x26	**72.00**
830	500x¼	24x24	**57.00**
....	.....	.....	.....

WITH PATENT DROP LEVER

No.	Capacity Pounds	Size of Platform Inches	Price Each
862	2000x½	32x32	**128.00**
864	1500x½	30x30	**98.00**
868	1000x½	26x26	**77.00**

WITH PATENT DROP LEVER

No.	Capacity Pounds	Size of Platform Inches	Price Each
836	2000x½	32x32	**133.00**
838	1500x½	30x30	**103.00**
842	1000x½	26x26	**82.00**

SHORT PILLAR DORMANT SCALES

WITH CAST IRON PLATFORM, WOOD PANEL

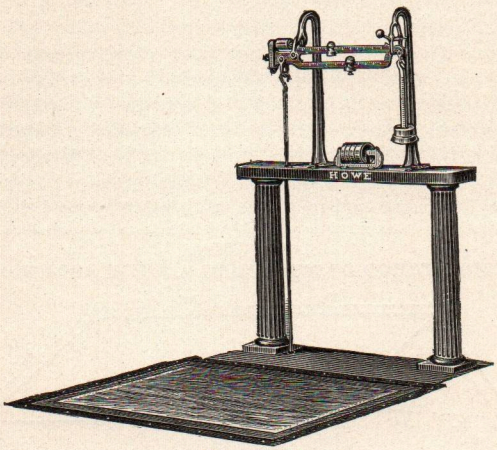


Fig. 17523A

This scale is furnished with strong short pillars. Hardwood shelf and iron beam hangers. This is one of the most popular types of scales made because the weigher can read figures on beam quicker on account of better light. Used largely by malleable iron works and kindred lines.

Double Brass Beam { 100x½ pounds on upper bar. 200x1 " " lower "

With brass graduated counterpoise.

FIRST DIMENSION OF PLATFORM IS PARALLEL WITH BEAM

No.	Capacity Pounds	Size of Platform Inches	Edge of Platform to Pillar Inches	Extreme Size of Floor Opening Inches	Price
1087	1500	44x34	15	44⅜x53⅞ x 9½	**130.00**
1086	2500	36x38	15¼	44 x61¼x 9½	**135.00**
1089	2500	38x46	15¼	44 x69¼x 9¼	**145.00**
1090	2500	46x38	15¼	47 x61½x 9⅝	**135.00**
1085	3500	43x45	17⅜	44 x70 x 9¼	**150.00**
1083	5000	48x48	16⅛	48⅝x72 x12	**200.00**
5008	**6000**	**60x54**	**15½**	60⅝x78 x12	**280.00**

CORRUGATED ROOFING AND SIDING

STANDARD GAUGES AND SIZES

PACKED 10 SHEETS TO BUNDLE

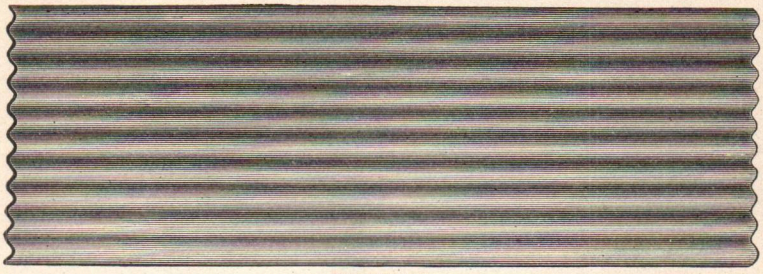
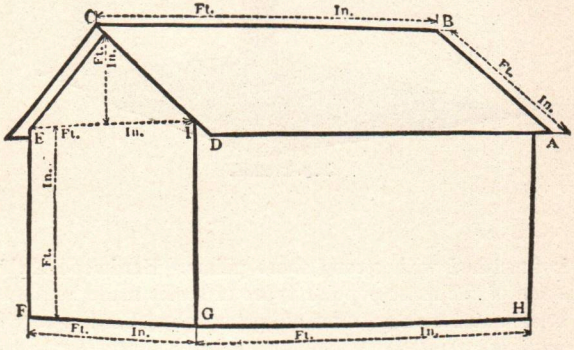
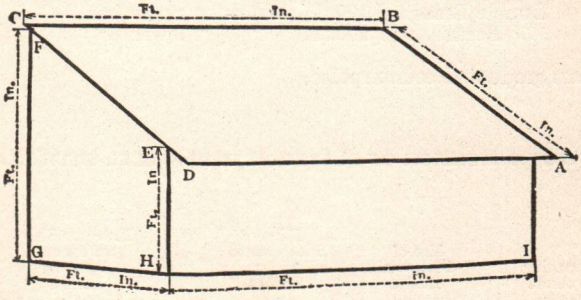


Fig. 17518A

SHOWING METHOD OF MEASURING A RIDGE ROOF BUILDING



SHOWING METHOD OF MEASURING A SHED ROOF BUILDING



IN ORDERING ROOFING

Always state whether for shed or ridge roof, give length of building, and distance from ridge to eaves. This enables the manufacturer to fill orders more promptly.

Measure carefully in accord with the diagrams above. Allow two to four inches to lap over at eaves and same at ends of building. We do not advise the use of corrugated roofing on any roof of less pitch than three inches to the foot, and more is better. It should be laid on close boarding, or strong laths, not more than one to two feet apart.

CORRUGATED ROOFING AND SIDING

PACKED 10 SHEETS TO BUNDLE

2½-INCH CORRUGATIONS

No. 12 gauge and lighter. Full width 26 inches. Covering width 24 inches, when lapped one corrugation, or full width 27½ inches, finished with one edge curved up and the other curved down. Covering width 24 inches, when lapped 1½ corrugations. Weight, per square.

Gauge.....No.	29	28	26	24	22	20	18	16
Painted.....pounds	..	68	83	110	136	163	217	271
Galvanized..... "	77	85	98	124	151	178	232	286

1¼-INCH CORRUGATIONS

No. 20 gauge and lighter. Full width 25 inches. Covering width 24 inches, when lapped one corrugation. Standard lengths 5, 6, 7, 8, 9, 10 and 12 feet. Weights per square.

Gauge .....No.	28	27	26	24	22
Painted.....pounds	72	79	86	114	142
Galvanized..... "	87	94	101	129	157

⅝-INCH CORRUGATIONS

No. 24 gauge and lighter. Covering width 24 inches. Standard lengths 5, 6, 7, 8, 9 and 10 feet. Weights per square.

Gauge.....No.	28	27	26	24	22
Painted.....pounds	72	79	86	114	142
Galvanized..... "	87	94	101	129	157

Unless ordering specific number of sheets, please make sketch giving the dimensions of the space you wish to cover and material wanted.

FOR ROOFING

Fig. 17579A

A lap of one and one-half corrugations should be made when corrugated iron is used for roofing.

FOR SIDING

Fig. 17579B

A side lap of one corrugation, and an end lap of one inch is sufficient when corrugated iron is used for siding.

Number of square feet in corrugated sheets.

Width of sheets, 26 inches.

Length of Sheets.....feet	6	7	8	9	10	12
Square.....per sheet	13	15⅙	17⅓	19½	21⅔	26

CORRUGATED ROOFING

RIDGE ROLL

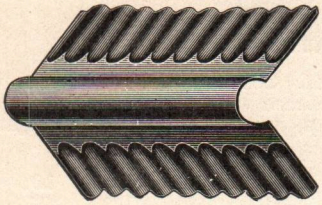


Fig. 17574A

Corrugated ridge roll or roll cap. 20-gauge, 52 inches long, 14-inch girt. For making comb or ridge of roof perfectly water-tight.

Painted or galvanized.

For Corrugated Roofing inches	2½	1¼
Weight per 100 Feet...pounds	85	120
Price.....per lineal foot	...	...

PLAIN RIDGE ROLL

Fig. 17574B

In 10-foot lengths only.

Painted or galvanized.

Size Cap.....inches	1¼	1½	2
Width of Apron... "	1½	2	2½
Girt..... "	7	8	10
Weight per 100 Feet.lbs.	45	50	60
Price, Painted...per foot	.12	.14	.17
" Galvanized "	.14	.16	.19
Size Cap.....inches	2½	3	...
Width of Apron... "	3	3½	...
Girt..... "	12	15	...
Weight per 100 Feet..lbs.	72	90	...
Price, Painted...per foot	.21	.26	...
" Galvanized "	.23	.28	...

CRIMPED ROOFING

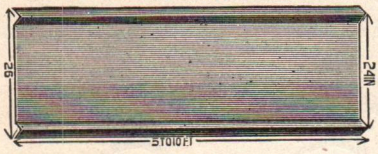


Fig. 17574C

2V Crimped Roofing with sticks. Extreme width 26 inches. Covering width 24 inches.

Painted or galvanized.

Gauge..... No.	28	28	28
Length.....inches	72	84	96
Price.....per sq.	...	...	...
Gauge.....No.	28	28	...
Length.....inches	108	120	...
Price.....per sq	...	...	...

STANDING SEAM ROOFING

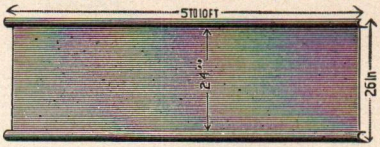


Fig. 17574D

Pressed standing seam. Extreme width 26 inches. Covering width 24 inches.

Painted or galvanized.

Gauge.....No.	28	28	28
Length.....inches	72	84	96
Price.....per square	...	...	...
Gauge.....No.	28	28	...
Length.....inches	108	120	...
Price.....per square	...	...	...

A square of roofing contains 100 square feet. Average weight per square painted, 71 pounds, galvanized, 81 pounds.

LEAD WASHERS

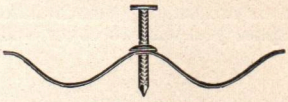


Fig. 17574E

Will prevent leaks in roofing and siding when used as shown in illustration.

These washers make an absolutely water-tight joint on any surface, whether concave, convex or flat. They also prevent rust below the nail head and the head from cutting into the sheet, thus making a more durable job. Packed in boxes containing 100 pounds each; 1 pound contains about 325 washers; 1 pound will go for two or three squares of roofing.

Price, Lead Washers....per pound	....
" Dry Paint—Enough for One Square.....per package	....
Price, Wire Nails—Enough for One Square.....per package	....

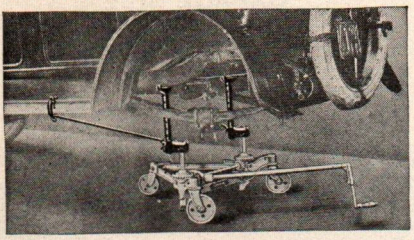
Nails and paint will not be shipped with roofing unless ordered. Red paint always sent unless some other color is specified.

WEAVER GARAGE EQUIPMENT

1919 REVISION

BODY EXTENSIONS

FOR EXTRA HEAVY AUTO TWIN JACKS



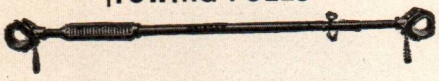
The need of an equipment of this nature is felt almost every day in every auto repair shop.

Either or both axles may be removed and the car rolled to an out-of-the-way place in the shop while the necessary repairs are being made upon the axles.

FULL ADJUSTMENTS.— The extensions can be quickly attached and adjusted to fit any width frame from 24 to 36 inches. The height has a convenient pin adjustment with a range of from 18 to 36 inches.

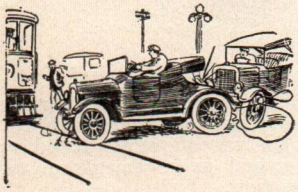
Price, Complete.....each **8.00**

TOWING POLES



This simple device will be appreciated by anyone who has ever had to do with towing a disabled car by means of an ordinary line.

NO DANGER OF JAMMING

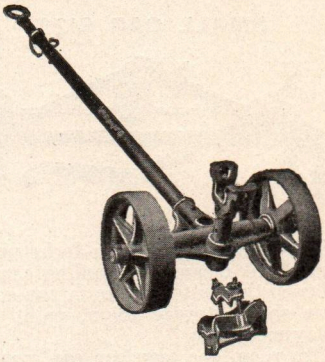


The possibilities of accident and serious complications which so often accompany the use of the tow line are practically eliminated by the use of this pole.

Brakes of the towing car are in absolute control of rear car. Spring absorbs all shocks. The heavy coil spring cushions all pulling or ramming shocks.

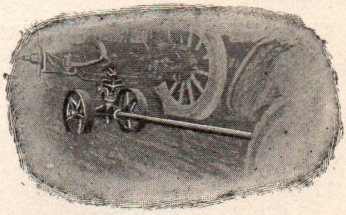
Price.....each **12.00**

AUTO AMBULANCES



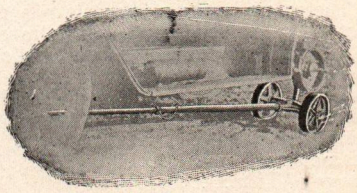
The Weaver auto ambulance is a thoroughly practical and universal device for economically transporting disabled autos to the repair shop. It is designed extremely strong, but all unnecessary weight has been eliminated, so that it many be placed in the service or towing car and

ATTACHED TO FRONT AXLE



carried to the wreck, instead of being pulled behind the service or towing car, as would be necessary with a heavier machine. Can be attached to front or rear axles, as illustrated.

ATTACHED TO REAR AXLE



Price.....each **36.00**

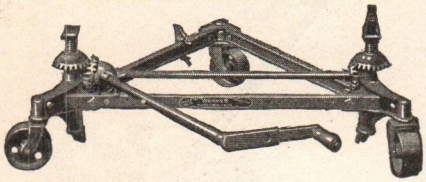
Prices are F. O. B. Factory

WEAVER GARAGE EQUIPMENT

1919 REVISION

AUTO-TWIN JACKS

SMALL CAR SIZE

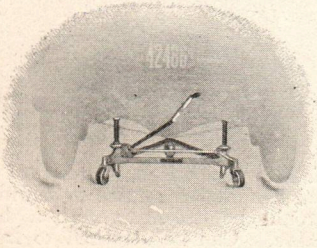


The Weaver Auto Twin-Jacks provide an excellent means of handling complete or dismantled automobiles in the garage, repair shop, storage room, paint shop, display room, etc.

With them one man can easily manipulate a car in any desired manner. They supply all the service of turntables, lifting jacks and tire rests.

As a lifting jack, the 34-inch wheel base offers an absolutely safe and dependable support for dismantled cars. Brakes can be safely and quickly tested with the rear axle supported on one of these jacks. The long extension handle is also a great convenience.

TRUSS-RODS DO NOT INTERFERE



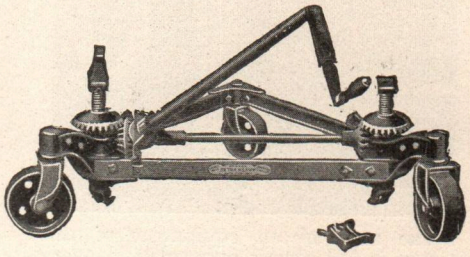
Cars can be moved sideways, cut in at right angles or turned completely around within their own length.

The screw hoisting principle is a great factor for safety, as there are no ratchets to jar loose or become dislodged and allow the car to fall.

Lifting Capacity	pounds	4000
Diameter of Wheels	inches	4½
Length of Handle	"	.....
Diameter of Screw	"	1 1/16
Range of Lift	"	9
Wheel Base	"	34
Price Single Jacks	each	**15.00**

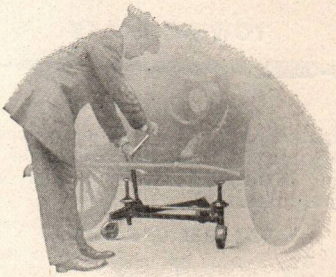
F. O. B. Factory.

GARAGE SIZE



Since the small car size Auto-Twin Jack was put on the market, there have been numerous calls for a heavier Auto-Twin Jack for service under medium trucks or extremely heavy pleasure cars where the conditions to be contended with are particularly difficult. The extra heavy Auto-

CONVENIENT TO OPERATE



Twin Jack answers all these requirements. It is identical in principle with the smaller but has twice the strength and capacity, with several improvements in detail of construction.

Lifting Capacity	pounds	8000
Diameter of Wheels	inches	6½
Length of Handle	"	33
Diameter of Screw	"	1¼
Range of Lift	"	9½
Wheel Base	"	38
Price Single Jacks	each	**25.00**

F. O. B. Factory.

WEAVER GARAGE EQUIPMENT

1919 REVISION

VALVELESS BUCKET PUMPS

The lubricant can be pumped out of the bucket and directly into the desired receptacle, the discharge being accurately measured as delivered.

If it is desired to handle a lubricant of a different quality than that contained in the bucket, simply insert the nozzle of the hose into a can of the desired quality of grease, and the barrel or chamber of the bucket may be drawn full of the foreign grease and in turn discharged into the desired receptacle without in the least disturbing the contents of the pump bucket.

The lid of the bucket is made in 2 sections, the one sliding within the other. One entire half of the mouth of the can may be exposed for filling. Shipping weight, 25 pounds.

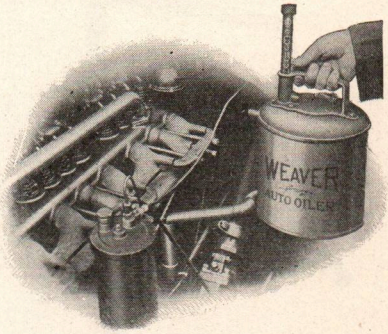
Price.....each **14.00**

F. O. B. Factory.

AUTO OILERS

The Weaver Auto Oiler combines into one conveniently handled unit the services of the ordinary funnel, oil can and oil measure and also eliminates the inconvenience, the waste and the dirt which always accompany the handling of oil in the ordinary manner.

The long tubular spout can be turned downward into any position to enable it to be most conveniently inserted into the oil opening of the engine. On a great many engines the oil opening is so obstructed by the manifold or other attachments of the engine that it is almost impossible to use the ordinary type of funnel satisfactorily.



The Weaver Auto Oiler is very well constructed of heavy galvanized iron and has a capacity of 2 gallons. The indicator is very accurate, being controlled by a compensating float which will accommodate itself to the wash of the oil. Shipping weight, 10 pounds.

Price.....each **8.00.**

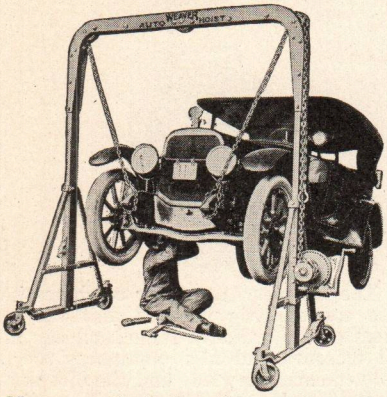
F. O. B. Factory.

WEAVER GARAGE EQUIPMENT

AUTO HOISTS

1919 REVISION

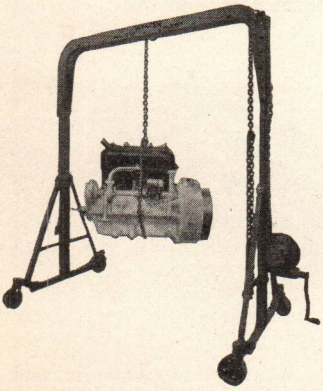
DOUBLE SUSPENSION



Note particularly the unobstructed space under the car, allowing ample room for two or more mechanics to work with absolute freedom.

This hoist can be run into position over a car in a crowded shop without requiring more than 12 to 14 inches space on either side of the car.

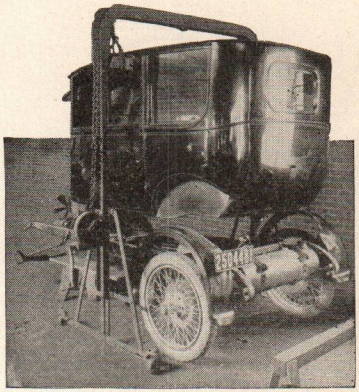
SINGLE SUSPENSION



There is no work which can be performed by the ordinary block-and-tackle or crane which cannot be performed to better advantage by the Weaver Auto Hoist.

This hoist can also be adapted to many conditions absolutely impossible to meet with the equipment mentioned above.

TELESCOPING FRAME



One chain of the hoist may be carried over the pulley in the center of the frame for performing work which can be handled to better advantage by a single suspension.

The side braces are sufficiently narrow at bench height to enable the hoist to be run up close to the bench and an engine or similar burden deposited upon it.

The frame of the Weaver Auto Hoist is designed so as to permit the height of the arch to be increased approximately 20 inches, allowing the uprights to be raised to the desired height in the braces on either side, by means of the worm hoist. This increased height enables the hoist to raise the rear end of a limousine or a touring car with the top up, for removing the rear system.

The illustration also shows another application of the hoist. Sedan bodies may be lifted off the chassis and placed upon horses or other supports while car is being repaired.

Another advantage of the telescoping frame is that at normal height it is low enough to pass through the ordinary door.

Carried upon 4 ball and roller-bearing casters 5 inches in diameter, which permit it to be transported with perfect ease. The construction throughout is of steel. Height 7½ ft. Lifting capacity from the sides, 3000 pounds, from center, 1500 pounds. Shipping weight, 575 pounds.

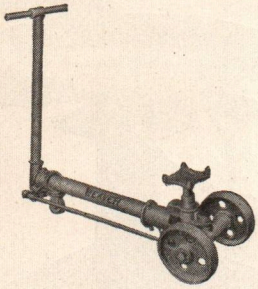
Price.....each **125.00**

F. O. B. Factory

WEAVER GARAGE EQUIPMENT

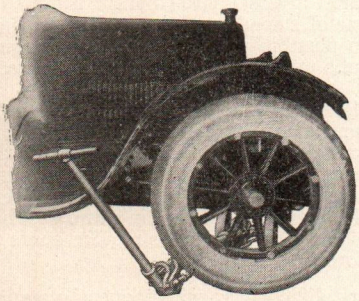
WEAVER NEW WAY JACKS

CAPACITY, 5000 POUNDS



For quick action in lifting or moving cars or trucks in the garage, service station, tire shop, etc., there is need of a strong, compact, easy operating, quick action lifting and transporting jack. These requirements are met in every detail in the Weaver New-Way Jack.

The length of the frame and wheels over all is only forty inches, and is easily manipulated in cramped positions. The wheels pivot and are guided and controlled by the handle. Car can be lifted easily by one or two strokes of the handle. The maximum height being 19 inches while the minimum is only 9 inches. A release latch provides for the lowering.

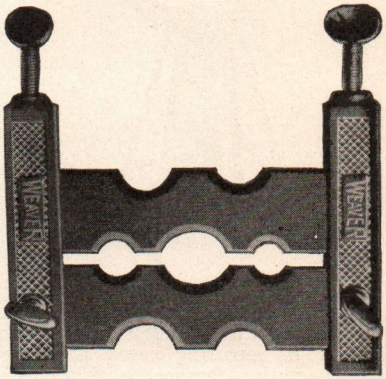


This jack is extremely heavy and well constructed. The mechanism is of hardened steel. Wheels are mounted on roller bearings, caster under front is equipped with a full set of ball bearings.

Shipping Weight.....pounds 100
Price, Complete.....each **35.00**

WEAVER PULLER CLAMPS

FOR PRESSES



The Weaver Puller Clamp is designed essentially for service with the Weaver 20-ton press, and is used to securely clamp and support ball races or similar parts which can only be successfully supported by being securely clamped from the side.

The blades of the Weaver puller are equipped with notches of various proportions, and are designed so that they may be forced into contact with the part in question by means of thumb screws in the side of brackets.

When the ball race is mounted on the shaft without sufficient space between it and main body of the unit to enable the ball race to be supported from underneath, the jaws of the puller can be forced securely into the grooves, thus enabling it to be readily pulled off the shaft.

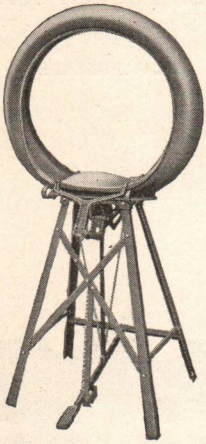
The plates are of high-grade spring steel, supported within strong, heavy side brackets. Their action is adjusted as desired by means of the large thumb screws. A big time and labor saver.

Price, (9-inch Plate).....each **6.00**
" (16 " ")..... " **10.00**

WEAVER GARAGE EQUIPMENT

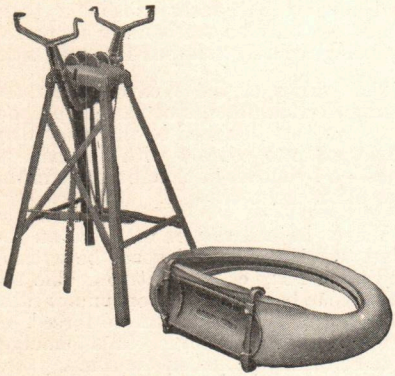
1919 REVISION

TIRE SPREADERS



The Weaver Tire Spreader is an efficient means of inspecting and repairing the interior of casings, which operation is always necessary in repairing every puncture, blow-out or other damage to either tube or casing.

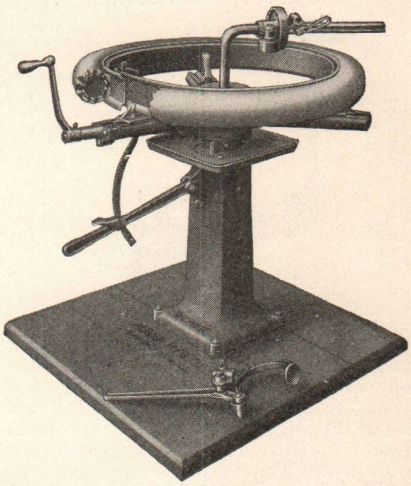
By means of a quick-acting foot lever the casing is spread to its limit, thus exposing the interior for convenient and efficient inspection.



By means of the Weaver Tire Spreader the repairman can quickly locate the break in the casing and can effectually demonstrate the necessity of having the casing properly repaired as well as the tube. Shipping weight, 65 pounds.

Price, Complete.....each **24.00**
" Buffing Plate, Extra " **3.00**
Prices are F. O. B. Factory.

UNIVERSAL TIRE CHANGERS



The Weaver Universal Tire Changer will handle most sizes and styles of auto tires or rims. The most difficult tires can be changed in a small fraction of the time required by the methods usually employed.

Every operation in the handling of tires by the Universal Tire Changer is done by means of smooth, polished rollers. There is no possibility of injuring either casing or tube even in the most stubborn cases.

The horizontal arm carrying the rollers and other attachments is revolved by hand, carrying the application of the rollers, etc. around the entire circumference of the tire. Thus one revolution of the arm accomplishes in minutes what would in many instances require hours to perform.

One difficult tire will frequently require from 1 to 2 hours' labor of 2 men — and thus consume the profits on a dozen normal changes where this service is charged for at a set price per change. Shipping weight, 300 pounds.

Price, Complete.....each **65.00**

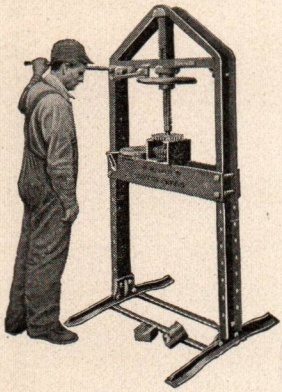
Prices are F. O. B. Factory.

WEAVER GARAGE EQUIPMENT

20-TON PRESSES

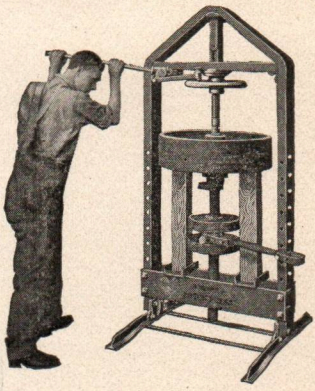
1919 REVISION

CAPACITY, 20 TONS



The many advantages of this press will be readily appreciated by anyone familiar with auto repair work. There is scarcely an hour of the day in any auto repair shop when this 20-ton press could not be used to advantage in straightening shafts or axles; pressing bearings or hubs in or out of wheels; forcing gearings or bushings on or off; or the many other operations which are crudely performed by improvised means at a great expenditure of time and expensive labor.

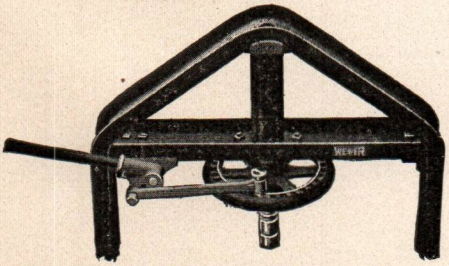
QUICK RELEASE FEATURE



By an ingenious but simple cam construction incorporated in the thrust bearing of the press, the most excessive pressure can be instantly released by one reverse stroke of the lever. This saves time and labor of releasing the pressure by 15 or 20 reverse strokes of the lever — as is necessary with other presses.

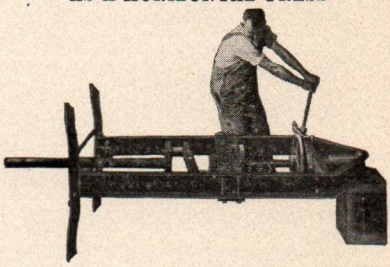
The frame is made of one piece of heavy 5-inch channel steel. The distance between the uprights of the frame is 32 inches, which permits the press to admit the largest automobile wheels.

GREAT LEVERAGE



A heavy handwheel, 15 inches in diameter, provides quick adjustment for ordinary light jobs. For securing the maximum pressure the lever construction, shown in the accompanying illustration, is used. This provides a leverage of 1500 to 1 and enables the maximum pressure of 20 tons to be accomplished with ease.

AS A HORIZONTAL PRESS



For pressing the bull pinion off a drive shaft, or similar cases where the shaft or rod is too long to be handled in the ordinary way. The press may be readily turned over on a box or similar support and be converted into a horizontal press. Shipping weight, 440 pounds.

Price, Complete . . . . . each **85.00**

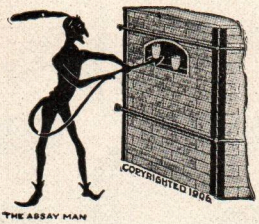
F. O. B. Factory.

THE MINE AND SMELTER SUPPLY CO.

MASSCO

DENVER · SALT LAKE CITY · EL PASO · NEW YORK

ASSAY DEPARTMENT



We especially wish to call your attention to our Assay Department which specializes in assayers' and chemists' supplies, laboratory equipment for schools and colleges, scientific apparatus and instruments.

The following pages show a few of our miners' specialties, acetylene welding outfits, etc.

If interested we will gladly furnish Special Assay catalogue upon application.

MASSCO SERVICE

MINERS' SUPPLIES

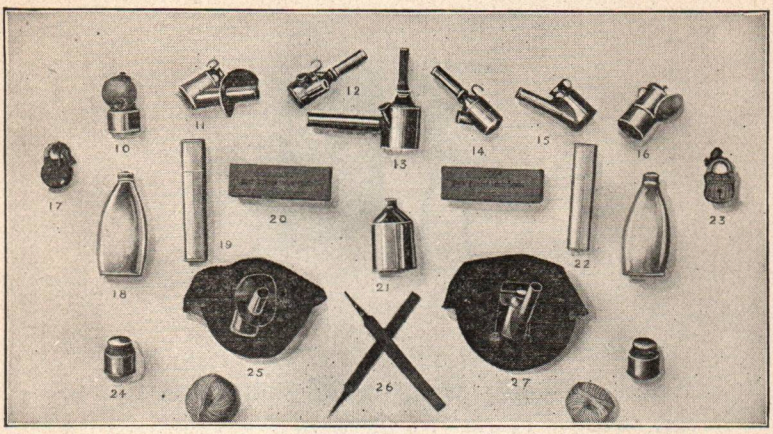


Fig. 27162A

No. 10—Acetylene Lamp.

No. 11—Coffee-pot Lamp with Shade.

No. 12—Surveyors' and Foreman's Lamp. Made of brass or copper with detachable side handle.

No. 13—Surveyors', Mine Bosses' and Foreman's Lamp. Made of brass, copper or tin, with detachable side handle.

No. 14—Surveyors' or Foreman's Lamp. Made of tin with detachable side handle.

No. 15—Coffee-pot Lamp without Shade.

No. 16—Acetylene Foreman's Lamp.

No. 17—Miners' Padlock.

No. 18—Oval Oil Bottle or Cadger.

No. 19—New Style Squib Boxes.

No. 20—Black Diamond Safety Squibs. Made in either gas or sulphur.

No. 21—Small Carbide Carrier.

No. 22—Common Squib Boxes.

No. 23—Miners' Padlock.

No. 24—Bottoms for Acetylene Lamps.

No. 25—Miners' Caps with Leather Peaks or Visors.

No. 26—8-inch and 12-inch Mill Files.

No. 27—Miners' Caps with Patent Leather Peaks or Visors.

No. 28—Owl Brand Miners' Cotton. We offer two grades of this cotton, the Owl Brand being the best, and the Star Brand being the next best.

Owing to the continual change in prices of these articles, we are not able to make any fixed price. However, we shall be glad to quote you our lowest prices upon application. We have enumerated the articles so that your inquiries may be answered quickly and intelligently.

PROSPECTORS' HAMMERS, PICKS AND MINERS' SUPPLIES

PROSPECTING HAMMERS
No. 311

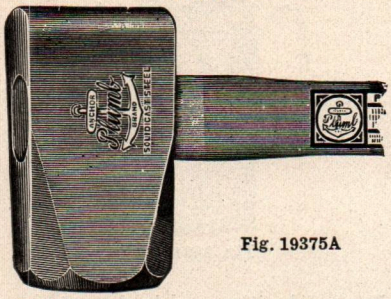


Fig. 19375A

Highly polished; packed one-third dozen in a paper box.

No.	Size	Weight Pounds	Weight Ounces	Price per Doz.
311	1	1	6	.....
312	2	1	12	.....

PROSPECTING PICKS

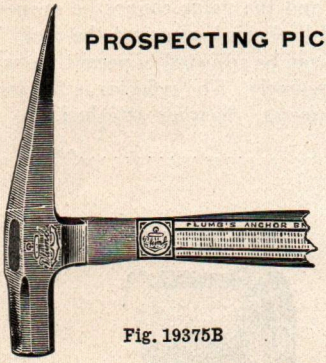


Fig. 19375B

Highly polished; packed one-half dozen in a paper box.

No.	Size	Weight Pounds	Weight Ounces	Price per Doz.
470	1	1	..	.....
471	2	1	8	.....

MINERS' CANDLESTICKS

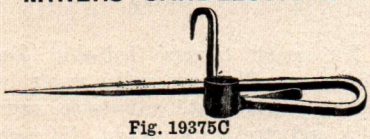


Fig. 19375C

Size of candlestick measures from hook to point; packed one dozen in a box.

Size.....inches	5	6½	7
Price.....per dozen	....	....	....

Prices upon application.

MINERS' GOLD WASHING PANS
No. E-1650

Fig. 19375D

Made of copper in sizes as listed below.

Diameter..... inches	12	16
Depth..... "	2	2½
Price.....each	....	....

No. E-1655

Fig. 19375E

Made of steel with copper bottom; 16 inches in diameter; 2½ inches deep.

Price.....each .....

MINERS' CANDLES

Fig. 19375F

GRANITE MINING CANDLES

Size	Ounces per Set	Sets, per Case
Sixes	16	20
"	16	40
"	14	20
"	14	40
Eights	14	40

EXTRA HARD GRANITE MINING CANDLES

Sixes	16	20
"	16	40
"	14	20
"	14	40
Eights	14	40

The above packed in layers.
Prices upon application.

JUSTRITE MINERS' LAMPS

No. 124

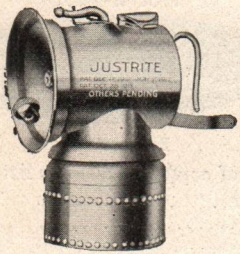


Fig. 26645A

No. 124 lamp is made of polished brass, with spiral feed and is a miner's cap lamp. Deep concave reflector is part of the lamp, cannot get loose or be broken off. Height of lamp, 4 inches; diameter of bottom, 2 inches; water tank, 1¾-inch diameter; 2¼ inches long; 16.7 candle power. Capacity, 2 ounces. ¼-inch carbide.

Price.....each ....

No. 85

Fig. 26645B

Drawn from seamless brass. Attached parts are riveted and soldered inside. Equipped with lighter attachment. Height of lamp, 4 inches; diameter of bottom, 2 inches; water tank, 1¾ inches in diameter; 2¼ inches long. Weight, 5 ounces; 16.7 candle power. Capacity, 2 ounces. ¼-inch carbide.

Price.....each ....

X-RAY

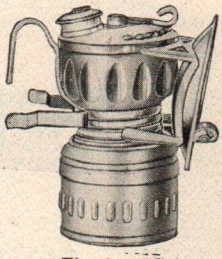


Fig. 26645C

Equipped with round hook, spring cap holder, and enclosed chamber water door. The water feed is regulated by a valve controlled by a lever fitting tightly over raised notches. The lever will not work loose and the valve cannot be opened or closed by bumping against the roof. The valve can be adjusted to permit the water to flow freely. The reflector is 2⅝ inches in diameter. Sparker attached.

Price.....each ....

Nos. 101 AND 103

Fig. 26645D

For metal miners' half-shift lamp. Equipped with lever valve water feed, lighter attachment, adjustable candle-stick and steel hook; height, 4¾ inches; diameter, bottom, 2 inches; weight, 5½ ounces; diameter of reflector, 2½ inches. Charge, 3 ounces. ¼-inch carbide.

Price.....each ....

JUSTRITE MINERS' LAMPS

ACCESSORIES AND REPAIR PARTS

CARBIDE CONTAINERS

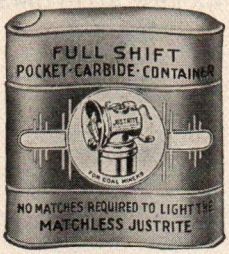


Fig. 26282A

Air-tight, concaved to fit the boot or hip pocket.

Price, No. 76, Capacity 7 oz....each .30
" " 77, " 10 "..... " .30

CARBIDE FLASKS

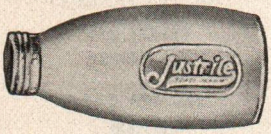


Fig. 26282B

Made of heavy tin, double seamed, strong, durable.

Price, Capacity 1 Pound.....each .50

TIP REAMERS

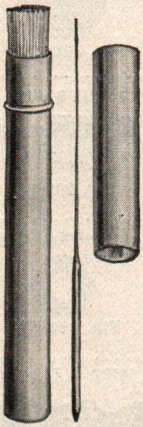


Fig. 26282C

Price, Reamers.....each .10
" Tubes..... " .10
" in Metal Tubes.....per doz. 1.30

REPAIR OUTFITS

Fig. 26282D

Made in three sizes, Nos. 1, 2 and 3.

The No. 1 outfit contains: 6 doz. No. 60 gaskets; 6 doz. No. 62 felts; 1 doz. No. 64 felt holders; 3 doz. No. 66 lava tips; 3 doz. No. 28 metal tips; 3 doz. No. 172 flints; 1 doz. No. 173 springs; 1 doz. No. 174 screw caps; 1 doz. No. 182 hexagon nuts; ½ doz. No. 177 lighters, complete; 2 doz. No. 37 tip cleaners.

The No. 2 outfit contains the same as the No. 1 box, approximately one-half quantity.

The No. 3, metal case, glass top, contains a larger assortment and a larger quantity than the No. 1.

Price, No. 1.....each 13.00
" " 2..... " 7.50
" " 3..... " 35.00

MINERS' CAPS

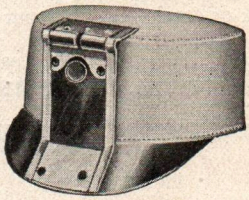


Fig. 26282E

Price.....each .50

WATERPROOF MATCH BOXES

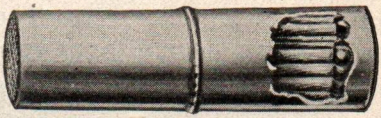


Fig. 26282F

Price.....each .30

JUSTRITE MINERS' LAMPS

ACCESSORIES AND REPAIR PARTS

No. 62 FELT PACKING

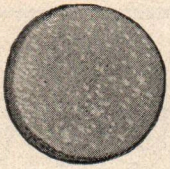


Fig. 26283A

Price.....each .05

No. 60 RUBBER GASKETS

Price.....each .05

No. 64 FELT HOLDERS

Price.....each .10

No. 66 LAVA TIPS

Fig. 26283B

Price.....each .05

No. 28 JEWEL METAL TIPS

Fig. 26283C

Shell made of brass with an imported lava burner insert, combining the best qualities of the metal and lava tip—will not break or crack—easy to put in and take out.

Price.....each .10

No. 78 VALVE STEMS

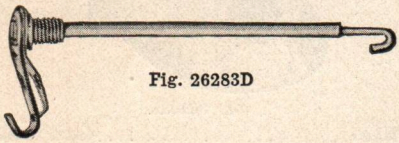


Fig. 26283D

Price.....each .50

No. 16 WIRE

Used for No. 78 valve stems.

Price.....each .05

No. 22 WIRE BRUSH CLEANERS

Fig. 26283E

Price.....each .10

EXTRA BOTTOMS

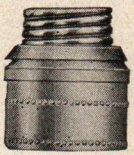


Fig. 26283F

Price, Polished Brass..... each .40
" Nickel-plated..... " .50

LIGHTER PARTS

No. 172 FLINTS

Fig. 26283G

Price.....each .05

No. 173 SPRINGS

Fig. 26283H

Price.....each .05

No. 174 CAPS

Fig. 26283J

Price.....each .10

No. 175 WHEELS

Fig. 26283K

Price.....each .10

No. 176 NUTS AND FORKS

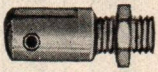


Fig. 26283L

Price.....each .20

No. 182 HEXAGON NUTS

Fig. 26283M

Price.....each .04

No. 177 LIGHTERS

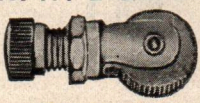
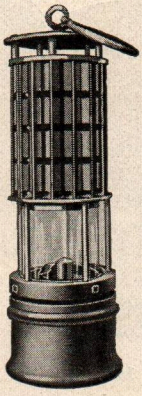


Fig. 26283N

Price.....each .30

WOLF MINERS' SAFETY LAMPS

No. 100



EXTRA PARTS FOR No. 100 LAMPS

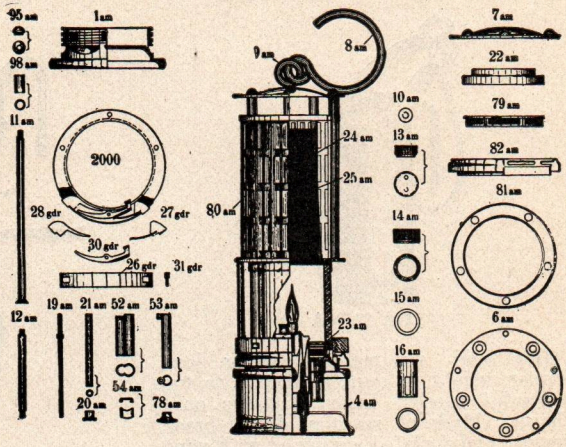


Fig. 24424A

No. 100 LAMPS

These lamps have round burner, taking air from below. They have corrugated shield, internal igniter and magnetic lock.

Made in steel, brass and aluminum.

Lamps equipped with our metal spark igniter, Model 1914.

Prices upon application.

EXTRA PARTS FOR No. 100 LAMPS

No.	Name of Part
1 am.	Top of Lamp Fount
4 am.	Lamp Fount
6 am.	Middle Ring
7 am.	Dome Top of Lamp
8 am.	Handle of Lamp
9 am.	Eyelet
10 am.	Washer
11 am.	Rods with Screw Heads
12 am.	Rods Fronting Glass Chimney
13 am.	Filling Hole Stopper
14 am.	Filling Hole
15 am.	Leather Washer
16 am.	Cylindrical Cotton Spreader
19 am.	Wick Adjuster
20 am.	Bushing
21 am.	Wick Adjuster Guide Tube
22 am.	Gauze Ring
23 am.	Expansion Ring
24 am.	Outer Wire Gauze
25 am.	Inner Wire Gauze
52 am.	Burner for Round Wick
53 am.	Wick Holder for Round Wick
54 am.	Wick Stop for Round Wick
78 am.	Wick Adjuster Knob
79 am.	Air Admission with Double Wire Gauze
80 am.	Corrugated Shield
81 am.	Strengthening Ring for Shield.
82 am.	Protecting Ring for Admission
95 am.	Nut for 11 am.
98 am.	Tube for Fastening 81 am.

ORDINARY MAGNETIC LOCK

2000	Complete Magnetic Lock
26 gdr.	Protecting Plate
27 gdr.	Anchor Spring and Spring Pole
28 gdr.	Anchor Pole
30 gdr.	Anchor Beam
31 gdr.	Anchor Screw

When ordering extra parts, please state whether same are required for a steel, brass, aluminum lamp.

MINERS' LAMPS

No. 150 I. T. P. LAMPS

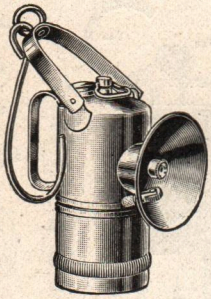


Fig. 19704A

Has rigid removable reflector, lava burner, weight 12 ounces; height to top of bail, 7 incehs; burns 6 hours on 1 charge. Made of seamless drawn brass, heavily nickel-plated, equipped with wind shield and I. T. P. float feed. It burns with an even, steady flame and never has to be raked or regulated.

Price, Complete.....each **3.00**

No. 130 PIONEER LAMPS

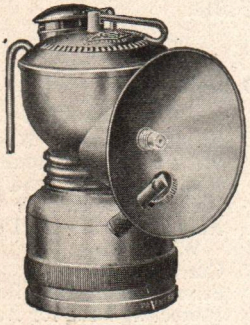


Fig. 19704B

Has no-trouble valve and embodies all advantages of the old reliable Baldwin straight wire feed, plus a strong water valve and water shut-off.

If dirt clogs the water tube, simply pump the water up and down a few times or close the valve, pull out the wire, scrape it clean, and slide it back again.

Also has non-leaking water cap, unbreakable hook, strongly re-enforced on inside and reflector brace soldered to tank.

Price, Lamp only.....each **1.00**
" Windshield..... " **.10**

No. 15 SUN RAY LAMPS

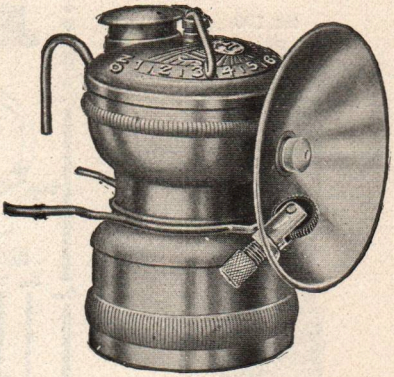


Fig. 19704C

Has a non-leakable water cap. A diaphragm inside the cap holds any water forced into the cap due to excess pressure until the pressure is relieved, when the water drips back into the tank.

The hook is turned at a sharp right angle inside the water tank and lies in a recess. This makes it possible to very securely fasten the wire inside the water tank.

The reflector brace and spreader wires are made in combination. This reduces weight and strengthens as well.

The knurling on the carbide container is made extra wide, affording a better grip as well as stiffening and strengthening the container.

The numbered notches on the top of the water tank aid the user in determining the position of the regulating lever.

The reflector collar is riveted. It cannot break loose and weighs less than a soldered collar.

The lamp is equipped with the Kra-Ker-Jack burner, which can be replaced without tools in half a minute and in the dark.

The gasket lies flat and will not curl out of place.

To reduce the weight of the lamp the tank has been cut down so that it holds just enough water to run the lamp for an hour and a half.

Price, Complete..... **1.00**

MINERS' LAMPS

No. 160 I. T. P. LAMPS

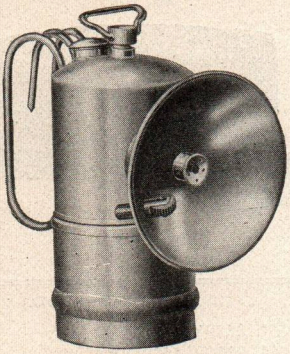


Fig. 19529A

Has float feed, rigid removable reflector, lava burner, weight, 11 ounces, height, 5¼ inches, burns 6 hours on one charge, made of seamless drawn brass, heavily nickel-plated, equipped with wind shield.

Burns steady and even. Never has to be raked or regulated.

Price, Complete.....each **3.00**

No. 200 I. T. P. TRIP LAMPS

SHOWS A RED LIGHT

Fig. 19529B

Has deep reflector, lava burner, weight, 2½ pounds, height, 6½ inches, burns 10 hours on one charge, equipped with wind shield.

Bracket furnished to fit any steel or wooden mine car. Reflector, 4½ inches in diameter, 1½ inches deep, finished in red enamel. Shows a strong red light at great distance without the use of glass.

It is held in place by a 1-inch heavy steel band welded to body of the lamp which slides into a tongue on car bracket.

Price, Complete.....each **5.50**

No. 203 I. T. P. LAMPS

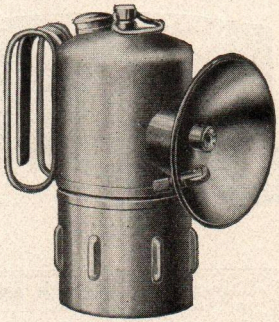


Fig. 19529C

Has float feed, rigid removable reflector, weight, 19 ounces, height, 6½ inches, burns 10 hours on one charge.

Equipped with hinged handles, sparker lighter, wind shield and one container.

A substantial inspector's lamp that requires no attention while burning and never has to be raked or regulated.

Price, Complete.....each **3.25**

No. 205 I. T. P. LAMPS

Fig. 19529D

Has float feed, rigid removable reflector, lava burner, weight, 19 ounces, height of lamp, 6½ inches, height to top of bail, 9¾ inches, burns 10 hours on one charge.

Equipped with sparker lighter and wind shield.

Price, Complete.....each **3.50**

MINERS' CAPS

No. 103

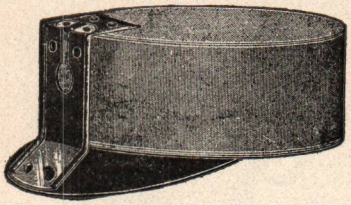


Fig. 15661A

No. 106

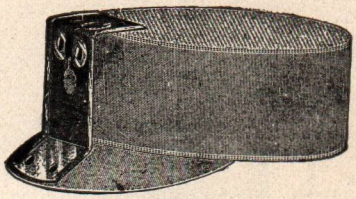


Fig. 15661B

No. 101,	10-ounce	White	Duck,	assorted	sizes	.....	per dozen	....
" 102,	10 "	Brown	"	"	"	.....	"	....
" 103,	8 "	White	"	"	"	.....	"	....
" 104,	8 "	Brown	"	"	"	.....	"	....
" 106,	12 "	White	"	"	"	.....	"	....

Nos. 101, 102, and 106 have patent butterfly and stirrup attachment.

No. 1 A

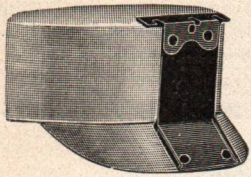


Fig. 15661C

Nos. 1 and 2 B

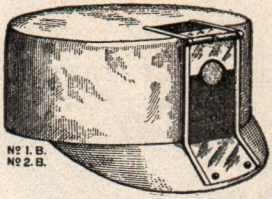


Fig. 15661D

No. 1A,	12-ounce	White	Duck,	assorted	sizes	.....	per dozen	....
" 10A,	10 "	"	"	"	"	.....	"	....
" 2A,	12 "	Brown	"	"	"	.....	"	....
" 1B,	10 "	White	"	"	"	.....	"	....
" 12B,	12 "	"	"	"	"	.....	"	....
" 2B,	10 "	Brown	"	"	"	.....	"	....

Nos. 1 and 2A have Lattimore attachment.

Nos. 50 and 51

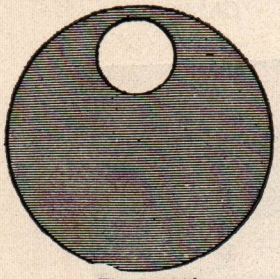
Fig. 15661E

No. 50,	8-ounce	Brown	Duck,	assorted	sizes	.....	per dozen	....
" 51,	8 "	White	"	"	"	.....	"	....

These are the old style leather attachment.

MINERS' CHECKS, LAMP WICK AND CARBIDE

MINERS' CHECKS

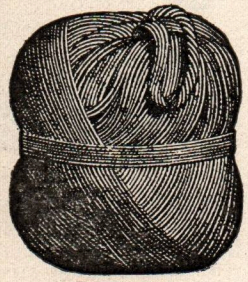


Made in three sizes; 1⅜, 1½ and 1¾ inches in diameter with ⅜-inch hole.

Fig. 23994A

Price.....per pound ....

BALL LAMP WICK



This wick is put up in 5-pound bales, and runs from 8 to 9 balls to a pound.

Fig. 23994B

Price, Best Grade.....per pound ....
" Medium Grade... " ....

UNION CARBIDE

100-POUND DRUMS

Fig. 23994C

For use in miners' lamps. Packed in drums of 100 pounds.

Price .....per pound ....

UNION CARBIDE

2-POUND CANS

Fig. 23994D

Packed in blue and gray cans consisting of ½-inch lump, 24 cans in a case.

Price, per pound ....

10-POUND CANS

Packed in gray cans with blue bands consisting of 1-inch lump, 6 cans in a case.

Price, per pound ....

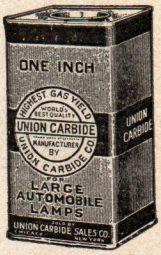


Fig. 23994E

25-POUND DRUMS

Fig. 23994F

Packed in blue and gray drums for use in miner's lamps.

Price, per pound ....

100-POUND DRUMS

Put up for special use in miners' lamps and packed in gray drums with blue bands.

Weight.....pounds 100
Price.....per pound ....

JOHNSON'S EMERGENCY CASES

WOOD'S EMERGENCY CASES

No. 6

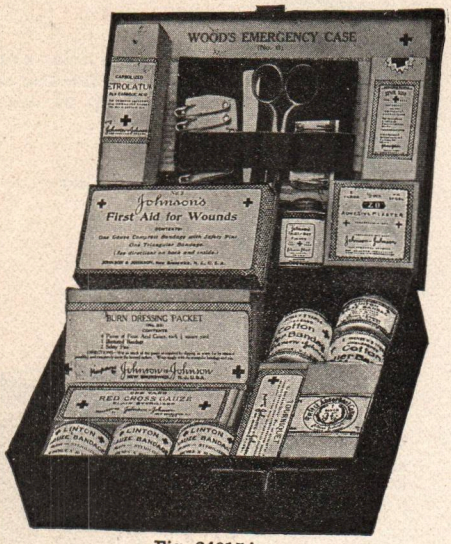


Fig. 24015A

Wood's Emergency Case enables every home, every small shop, every camp to have a system of furnishing first aid. The effects of an accident may be intensified for lack of immediate care of the injured person. With such a case handy, the first aid worker can not only alleviate the injured person's pain, but cleanse the wound or prepare it for permanent dressing by the physician.

It is especially designed for camp, automobile, launch, home or small shop, where a compact and convenient accident outfit is desired.

The case is black japanned metal, hinged cover fastener.

It contains: One first aid for wounds packet; one brown dressing packet; with two yards of Red Cross gauze; 1 ounce of cotton; four gauze bandages; two cotton bandages; one spool Z O adhesive plaster; one tube carbolized petrolatum for burns and scalds; one tourniquet, to stop hemorrhage; one pair of scissors; one pair of tweezers; safety pins and a handbook of First Aid. Price, Complete.. each **3.75**

AUTOMOBILE EMERGENCY CASES

No. 8

Fig. 24015B

A small compact outfit for automobile equipment. Made of strong black metal, highly ornamental and serviceable.

It contains: One first aid for wounds packet; 1 yard aseptic gauze; one 2-inch gauze bandage; one 2-inch cotton bandage; one cylinder adhesive plaster; one tube carbolized petrolatum for burns; one pair of tweezers; one pair of scissors; safety pins.

Price, Complete ..... each **2.50**

JOHNSON'S STANDARD FIRST AID MANUAL

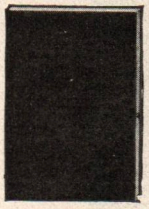


Fig. 24015C

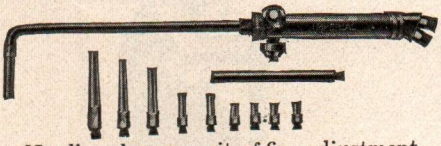
This is a working and teaching text book on first aid. Technical terms have been avoided and the subject placed before the reader in the simplest form.

It has been welcomed as a handy book of ready reference in homes, offices stores, factories, and institutions as it tells just what to do at the instant of an accident.

Price, Cloth Bound ..... each **.50**
" Paper Cover..... " **.25**

IMPERIAL WELDING, CUTTING AND DECARBONIZING OUTFITS

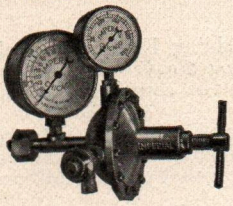
TYPE B WELDING TORCHES
WITH 10 TIPS AND EXTENSION



Needle valves permit of fine adjustment and are located so as to enable the operator to make any desired adjustment of the flame without having to lay aside the welding stick. Due to large number of tips, an exactly correct size of flame is always available.

Price, with 10 Tips and Extension.....each **25.00**

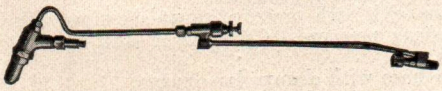
TYPE C OXYGEN REGULATORS



Oxygen Regulators have phosphor bronze diaphragms to withstand the chemical action of the gas. Threaded to fit all standard oxygen tanks. Automatic safety features possessed by no other regulators.

Price, with Gauges.....each **25.00**

TYPE DB CUTTING ATTACHMENTS

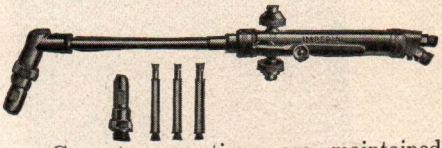


Quickly and easily attached to the Type B or D Welding Torches by removing the welding head and screwing the cutting attachment in place. This attachment is a regular part of the Type D Torch furnished with Outfit No. 4, but may be purchased separately if desired.

Particularly for use where only occasional cutting is required. When continuous heavy cutting is necessary, the Type E Cutting Torch will give better results.

Price, Cutting Attachment...each **20.00**

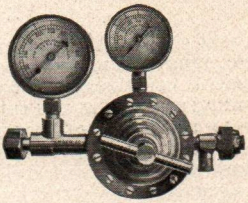
TYPE E CUTTING TORCHES
WITH 2 HOUSINGS AND 4 TIPS



Correct proportions are maintained between size of preheating flame and oxygen jet for all thicknesses of metal. This results in the narrowest possible cut and accounts for the minimum consumption of gas as well as the smooth, square edges of the cuts. Entire safety in using.

Price, with 2 Housings and 4 Tips.....each **45.00**

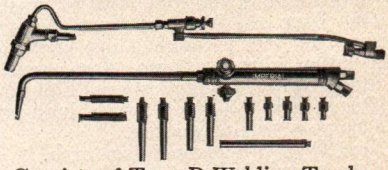
TYPE AA ACETYLENE REGULATORS



Have German silver diaphragms to withstand the action of the gases. Deliver a constant predetermined volume and velocity of gas to the torch and the movement of the valve seat is limited so as to prevent cutting seat.

Price, with Gauges.....each **22.00**

TYPE D COMBINATION TORCHES
WITH CUTTING ATTACHMENT



Consists of Type B Welding Torch and Cutting Attachment. Welding head, extension, 10 welding tips, 3 cutting tips and one housing included. Can readily be changed from a welding to a cutting torch and is designed for use where most of the work is welding and only occasional cutting is required, making an ideal torch for garages and general repair shops.

Price, with Cutting Attachment...each **45.00**

IMPERIAL WELDING OUTFITS

No. 1

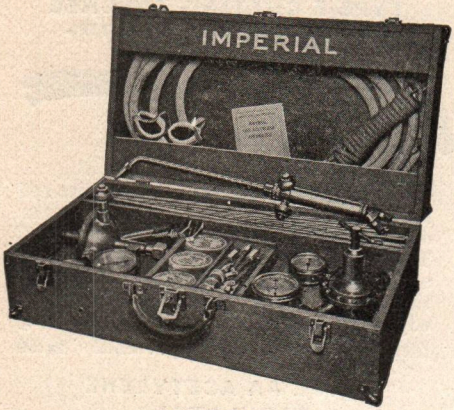
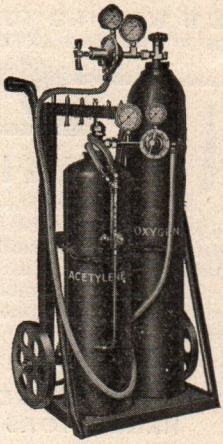


Fig. 19319A



This outfit consists of a complete No. 1 Imperial Welding Equipment packed in a stoutly built, brass bound, hardwood carrying case with hinged cover and leather handle.

Convenient compartments are provided for holding the complete equipment, including welding accessories and supplies.

An important feature of Imperial Welding and Cutting Equipment, is its adaptability for use with oxy-hydrogen as well as oxy-acetylene. When it is desired to equip for both oxy-hydrogen and oxy-acetylene, the only change necessary is the addition of one hydrogen regulator and a set of hydrogen tips.

Tips for welding as well as cutting with hydrogen are furnished on request. Every tip is marked with the pressure of gases required.

This outfit is intended for continuous service on all kinds of heavy or light welding and is fully adequate to handle all work within the limit of the process.

Type G decarbonizing torch, by which carbon is quickly and effectively removed from gas engine cylinder, is regularly included.

No. 1 outfit consists of:

One Type B Imperial Welding Torch with 10 interchangeable tips for any thickness of material, extra section for heavy welding and union hose connections.

One Type C Imperial Oxygen Regulator with 3000-pound gauge showing tank pressure and contents, and low pressure gauge showing working pressure.

One Type AA Imperial Acetylene Regulator with high pressure gauge showing tank pressure and low pressure gauge showing working pressure. Cylinder or tank connections, outlet valves and union hose connections.

One length (12½ feet) special high pressure hose with clamps for oxygen.

One length (12½ feet) special high pressure hose with clamps for acetylene.

One pair welding goggles.

One Type G decarbonizing torch.

One wrench for regulators, hose connections and torch tips.

Supply of cast iron, Norway iron, bronze and aluminum welding rods, and fluxes for cast iron, brass and aluminum, also complete instructions included with each outfit.

Price, Complete..... **75.00**

The Imperial Truck shown above is a great convenience when outfit is to be frequently moved around shop or yards and eliminates danger of tanks being knocked over and consequent breakage of apparatus. It can be furnished if required.

Tanks shown are not furnished with this outfit.

IMPERIAL WELDING, CUTTING AND DECARBONIZING OUTFITS

No. 3, IMPERIAL CUTTING OUTFIT

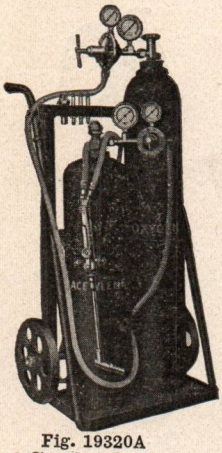


Fig. 19320A

The No. 3 Cutting Outfit is designed for continuous service and cuts wrought iron and steel from ⅛ to 12 inches in thickness.

No. 3 outfit consists of:

One Type E Imperial Cutting Torch with two housings and four tips for cutting wrought iron and steel from ⅛ to 12 inches in thickness.

One Type C Imperial Oxygen Regulator with 3000-pound gauge showing tank pressure and contents, and low pressure gauge showing working pressure.

One Type AA Imperial Acetylene Regulator with high pressure gauge showing tank pressure, and low pressure gauge showing working pressure.

Cylinder or tank connections, outlet valves and union hose connections.

One length (25 feet) special high pressure hose with clamps for oxygen.

One length (25 feet) special high pressure hose with clamps for acetylene.

Wrench, goggles and all necessary cylinder and hose connections. Complete instructions.

Outfit packed in hardwood brass bound tool box, as shown on another page.

NOTE.—The Imperial Truck, as listed on another page, is a great convenience when outfit is to be frequently moved around shops or yards, and eliminates danger of tanks being knocked over and consequent breakage of apparatus. Price.... **95.00**

No. 4, IMPERIAL COMBINATION WELDING, CUTTING AND DECARBONIZING OUTFIT

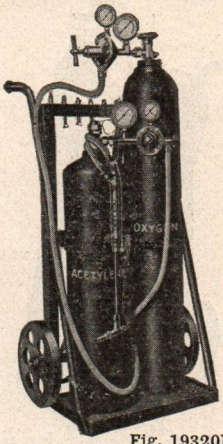


Fig. 19320B

The No. 4 Combination Welding and Cutting Outfit is adapted for use in garages, repair shops, etc., being especially designed for that class of work.

The torch supplied with the outfit has a cutting attachment which can quicky be connected to the torch, thus converting it into a cutting torch when desired.

Also includes a decarbonizing torch, by which carbon can be quickly and effectively removed from gas engine cylinders.

No. 4 outfit consists of:

One Type D Welding Torch, with 10 welding tips, extension, cutting attachment with one housing, and three cutting tips.

One Type C Imperial Oxygen Regulator with 3000-pound gauge showing tank pressure and contents, and low pressure gauge showing working pressure.

One Type AA Imperial Acetylene Regulator, with high pressure gauge showing tank pressure, and low pressure gauge showing working pressure.

One length (12½ feet) special high pressure hose with clamps for oxygen.

One length (12½ feet) special high pressure hose with clamps for acetylene.

One wrench and one pair goggles.

One Type G decarbonizing torch.

Supply of cast iron, Norway iron, bronze and aluminum welding rods, and fluxes for cast iron, brass and aluminum. Complete instructions. Price..... **90.00**

IMPERIAL WELDING, CUTTING AND DECARBONIZING OUTFITS

No. 5 IMPERIAL WELDING OUTFITS

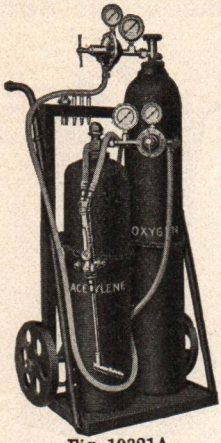


Fig. 19321A

This outfit is intended for continuous service and is adapted for all welding work within the limits of the process, and cuts wrought iron or steel from ⅛ to 12 inches in thickness.

This outfit consists of Type B Imperial Welding Torch with ten interchangeable tips for any thickness of material, extra section for heavy welding and union hose connections. Type E Imperial Cutting Torch with two housings, four tips and roller guide for cutting wrought iron and steel from ⅛ to 12 inches in thickness.

Type C Imperial Oxygen Regulator with 3000-pound gauge showing tank pressure and contents and low pressure gauge showing working pressure. TypeAA Imperial Acetylene Regulator with high pressure gauge showing tank pressure, and low pressure gauge showing working pressure. Cylinder or tank connections, outlet valves and union hose connections. Length 25 feet, special high pressure hose with clamps for oxygen.

Length 25 feet, special high pressure hose with clamps for acetylene.

Wrench and two pairs goggles. Type G carbon burning torch.

Supply of cast iron, Norway iron, bronze and aluminum welding rods, and fluxes for cast iron, brass and aluminum. Complete welding and cutting instructions. Outfit packed in hardwood brass bound tool box.

Price, Complete..... **120.00**

No. 6 OXYGEN DECARBONIZING OUTFITS

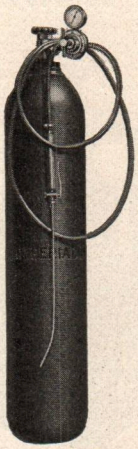


Fig. 19321B

This outfit is specially designed for the immediate and thorough removal of all traces of carbon from automobile cylinders by burning it out with oxygen.

The process is as follows: Combustion is started in the engine cylinder with a lighted taper, or match, inserted through spark plug opening, followed by inserting copper end of Imperial Decarbonizing Torch—thus introducing oxygen into the cylinder and the combustion completely consumes the carbon, leaving the cylinders clean. It is advisable to pour a little kerosene into the cylinders when the operation is finished.

A four-cylinder engine can be thoroughly cleaned with the Imperial Decarbonizing Outfit in less than thirty minutes, at a cost of from 10 to 15 cents per cylinder.

The Type G Torch has a self-closing trigger valve that shuts off the oxygen instantly when released, which makes a big saving in gas consumption.

No. 6 Oxygen Decarbonizing Outfit consists of:

One Type G Decarbonizer Torch fitted with shut-off valve and extra long flexible copper tubing.

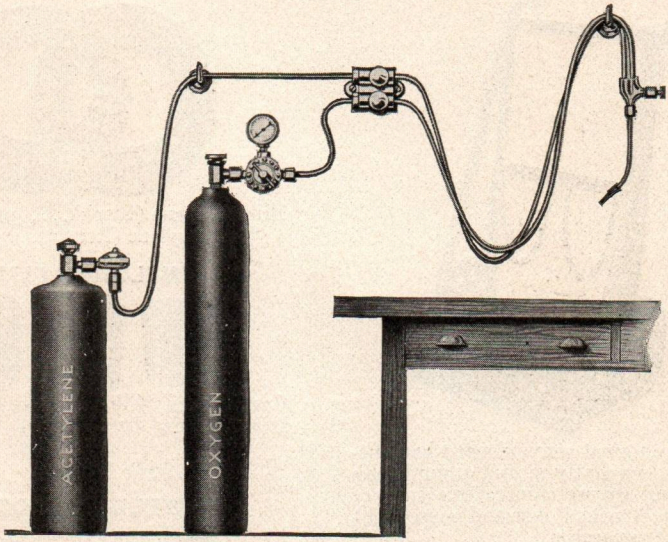
One 8-foot length Oxygen hose.

One Type D High Pressure Oxygen Regulator with pressure gauge and cylinder and hose connections.

Price, No. 6 Outfit Complete.each **15.00**

IMPERIAL LEAD BURNING OUTFITS

No. 20



For use with dissolved acetylene gas and oxygen in high pressure tanks. (Large or small size acetylene tanks may be used.)

The outfit consists of the following:

1 Type F oxygen regulating valve with 15-pound pressure gauge.
1 Type 10 R acetylene constant pressure regulator.
35 Feet 3/16-inch special rubber hose.
1 Bench block with 2 needle valves.
1 Type L Imperial Lead Burning Torch with 4 tips.
1 Wrench.

Outfit packed in individual carton.

In addition to lead burning, these outfits may be used to good advantage for light welding on all metals, repairing radiators, melting of platinum and other jeweler's work.

Price.....each **25.00**

No. 21

For use with hydrogen and oxygen in high pressure cylinders.

The outfit consists of the following:

1 Type F oxygen regulating valve with 15-pound pressure gauge.
1 Type FH Hydrogen Regulator with 15-pound pressure gauge.
35 Feet 3/16-inch special rubber hose.
1 Bench block with 2 needle valves.
1 Type L Lead Burning Torch with 4 tips.
1 Wrench.

Outfit packed in individual carton.

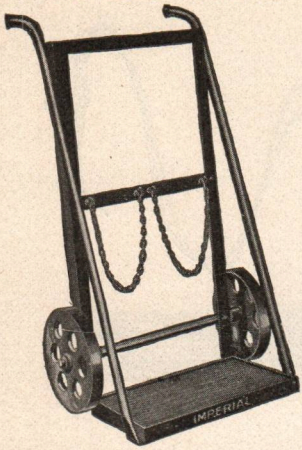
Can also be used for light welding on all metals.

Price.....each **30.00**

IMPERIAL WELDING OUTFITS

1919 REVISION

PORTABLE TRUCKS

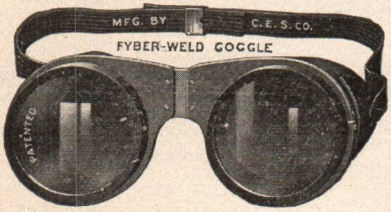


Not only a great convenience when outfit is to be frequently moved around shop or yards but its use eliminates danger of tanks being knocked over and consequent breakage of apparatus.

Price, No. 51H with 10x19-inch Platform for Two 100-foot Tanks . . . . . each **12.00**

Price, No. 52H with 12x24-inch Platform for Two 200-foot Tanks . . . . . each **15.00**

WELDERS' GOGGLES

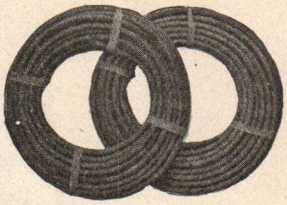


Price, No. 47H . . . . . per pair **5.00**
" " 48H (Green Glass) . " **3.00**

ASBESTOS WELDERS' GLOVES

Wool fleece lining. Afford maximum protection against heat and are fireproof.
Price, No. 56H . . . . . per pair **8.00**

HOSE

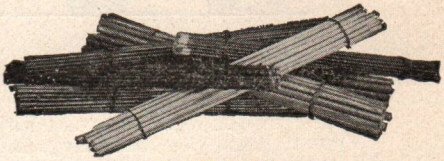


Price, Oxygen (Black) . . . . . per foot **.30**
" Acetylene (Red) . . . . " **.30**

WELDING FLUX

Cast Iron, in ½-lb. Cans . per pound **.60**
Brass Bronze or Copper in ½-lb. Cans . . . . . per pound **.60**
Aluminum, ½-lb. Cans . . " . . . .

WELDING RODS



CAST IRON

Size, 3/16, ¼, 5/16, ⅜, ½-in. diam., 18-in long.

NORWAY IRON

Size, ⅛, 3/16, ¼, 5/16, ⅜, ½-in. diam., 36-in. long.

MILD STEEL

Size, 3/16, ¼-in. diam., 18 in. long.

NICKEL STEEL

Size, ¼-in. diam., 36 in. long.

VANADIUM STEEL

Size, ¼-in. diam., 36 in. long.

TOBIN BRONZE

Size, 3/16, ¼-in. diam., 18 in. long.

CAST BRONZE AND BRASS

Size, ¼-in. diam., 18 in. long.

DRAWN AND CAST ALUMINUM

Size, ¼-in. diam., 18 in. long.

Also Norway and mild steel welding wire, and brass welding and brazing wire.

LEAD FOR IMPERIAL BURNING OUTFITS

Prices upon application.

ELECTRICAL DEPARTMENT

IN addition to our line of machinery and assay supplies, we carry a very complete stock of electrical supplies and apparatus.

From the few following pages you can make selections for material most generally used.

Our new electrical catalogue, No. 56, will be gladly furnished upon request to those desiring a complete listing.

Additions are constantly being made to our stock as we learn the requirements and demand of our trade.

Having been appointed by the Westinghouse Electric & Manufacturing Company, as their Agent-Jobbers in the territory served by our Denver and El Paso houses, we are in a position to supply you with anything they manufacture.

We earnestly solicit your inquiries and orders, assuring you of prompt replies and satisfactory service.

Should your order include any item which at the time is not in our stock, we will gladly obtain it in Denver, but if this is impossible, we will use our best endeavors to secure a prompt shipment from the factory.

RUBBER COVERED WIRES

SOLID COPPER CONDUCTORS

No. 10 SOLID SINGLE BRAID WIRE

Fig. 27740A

These rubber covered wires are made according to the specifications of the National Board of Fire Underwriters, and each coil is tested and stamped by the Wire Inspection Bureau before leaving the factory. The conductors are thoroughly tinned and are covered with two thicknesses of high-grade rubber compound, which is thoroughly vulcanized. The wires are braided with a standard cotton yarn, the braids being thoroughly saturated with a pure wax compound having a high melting point, and are smoothly and evenly finished. The smooth, hard finish given these wires enables them to be handled readily and makes them especially desirable for conduit work. The single braided wires can also be finished with a white fireproof compound over the braid.

Manufacturer's Numbers: Sin. Braid Blk. Finish Type Letter R. S.	Sin. Braid W't. Finish Type Letter R. S.	D'blé. Braid Blk. Finish Type Letter R. D.	Size American Wire Gauge (B. & S.)	Negohms per Mile after 12 Hours Immersion	Thickness of Rubber Inches	Approx. Diam. Over: Single Braid Inches	Double Braid Inches	Standard Packages Approx. Quantities Feet	Shipped on
810C	830C	850C	0000	.100	5/64	44/64	47/64	1000	Reels
810B	830B	850B	000	.100	5/64	40/64	43/64	1000	"
810A	830A	850A	00	.125	5/64	37/64	40/64	1000	"
810	830	850	0	.125	5/64	34/64	37/64	1000	"
811	831	851	1	.150	5/64	32/64	35/64	1000	"
812	832	852	2	.125	4/64	28/64	31/64	1000	"
813	833	853	3	....	4/64	26/64	29/64	1000	"
814	834	854	4	.150	4/64	24/64	27/64	1000	"
815	835	855	5	....	4/64	23/64	26/64	1000	"
816	836	856	6	.200	4/64	21/64	24/64	500	Coils
818	838	858	8	.200	3/64	17/64	20/64	500	"
820	840	860	10	.225	3/64	15/64	18/64	500	"
822	842	862	12	.250	3/64	14/64	17/64	500	"
824	844	864	14	.300	3/64	13/64	16/64	500	"
826	846	866	16	....	2/64	10/64	13/64	500	"
828	848	868	18	....	2/64	9/64	12/64	500	"

Prices upon application.

RUBBER COVERED CABLES

No. 00 STRANDED DOUBLE BRAID CABLE

Fig. 27739A

STRANDED COPPER CONDUCTORS

Rubber covered stranded conductors are made according to the specifications of the National Board of Fire Underwriters and each length is tested and stamped by the Wire Inspection Bureau before leaving the factory. The wires composing the conductors are thoroughly tinned and then laid up concentrically, giving the smallest diameter of any certain capacity. These conductors are pliable and are braided with cotton and saturated with a smooth and lasting compound, insuring their being readily handled in conduit work. The single braided conductors can also be finished with a white fireproof compound over the braid.

Manufacturer's Numbers						Approx. Diam. Over			
Sin. Braid Blk. Finish Type Letter R. S.	Sin. Braid Wt., Finish Type Letter R. S.	D'ble. Braid Blk. Finish Type Letter R. D.	Size American Wire Gauge (B. & S.)	Number and Size of Wires in Strand Inches	Thickness of Rubber Inches	Single Braid Inches	Double Braid Inches	Standard Packages Approx. Quantities Feet	Shipped on
557	577	867	0000	19 x .0756	5/64	49/64	52/64	1000	Reels
558	578	868A	000	19 x .0940	5/64	45/64	48/64	1000	"
559	579	869	00	19 x .0836	5/64	41/64	44/64	1000	"
560	580	870	0	19 x .0746	5/64	38/64	41/64	1000	"
561	581	871	1	19 x .0663	5/64	35/64	38/64	1000	"
562	582	872	2	7 x .0592	4/64	30/64	33/64	1000	"
563	583	873	3	7 x .0526	4/64	28/64	31/64	1000	"
564	584	874	4	7 x .0772	4/64	26/64	29/64	1000	"
566	586	876	6	7 x .0612	4/64	23/64	26/64	1000	"
568	588	878	8	7 x .0485	3/64	18/64	21/64	500	Coils
570	590	880	10	7 x .0385	3/64	16/64	19/64	500	"
572	592	882	12	7 x .0306	3/64	15/64	18/64	500	"
574	594	884	14	7 x .0243	3/64	14/64	17/64	500	"

Prices upon application.

RUBBER COVERED CABLES

250000 C. M. STRANDED DOUBLE BRAID CABLE

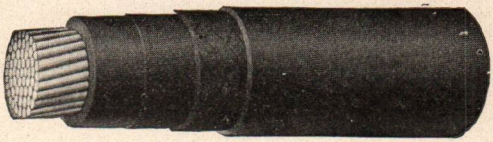


Fig. 27738A

These stranded conductors are made according to the specifications of the National Board of Fire Underwriters and each length is tested and stamped by the Wire Inspection Bureau before leaving the factory. The wires composing the conductor are thoroughly tinned and insulated with code thickness of high grade vulcanized rubber and protected with tape and with one or two smooth closely woven cotton braids which are saturated in black weatherproof compound.

No. Sin. Braid Over Tape Type R. D.	Circular Mils	Number and Diam. of Wires in Strand Inches	Thickness of Rubber Inches	Approx. Diam. Over Tape and Braid, Inches	Shipped on
340	250000	37x.0822	3/22	56/64	Reels
341	300000	37x.0901	3/22	59/64	"
342	350000	37x.0973	3/22	62/64	"
343	400000	37x.1040	3/22	65/64	"
344	450000	37x.1103	3/22	68/64	"
345	500000	37x.0905	3/22	72/64	"
346	600000	61x.0992	7/64	79/64	"
347	750000	61x.1109	7/64	86/64	"
348	1000000	61x.1280	7/64	96/64	"
348A	1250000	91x.1172	8/64	107/64	"
349	1500000	91x.1284	8/64	115/64	"
349A	2000000	127x.1255	8/64	129/64	"

RUBBER COVERED SWITCHBOARD CABLES

For switchboard, brush holder and similar connections where very flexible cables are required. Tinned annealed extra flexible strand of highest conductivity, insulated with code thickness of high-grade vulcanized rubber, protected with one or two smooth closely woven cotton braids, saturated in black weatherproof compound.

Number					Approx. Diam. Over			
Single Braid Type R. S.	Double Braid Type R. D.	American Wire Gauge (B. & S.)	Number and Diam. of Wires in Strand Inches	Thickness Rubber Inches	Single Braid Inches	Double Braid Inches	Standard Packages Approx. Quantities Feet	Shipped on
221	271	1	259x.018	5/64	37/64	40/64	1000	Reels
222	272	2	210x.018	4/64	33/64	36/64	1000	"
223	273	3	151x.018	4/64	30/64	33/64	1000	"
224	274	4	133x.018	4/64	27/64	30/64	1000	"
226	276	6	82x.018	4/64	23/64	26/64	1000	"
226A	276A	6	49x.023	4/64	23/64	26/64	1000	"
228	278	8	49x.0184	3/64	19/64	22/64	500	Coils
229	279	9	40x.018	3/64	18/64	21/64	500	"
230	280	10	19x.0234	3/64	17/64	20/64	500	"
232	282	12	19x.0185	3/64	15/64	18/64	500	"
234	284	14	19x.0147	3/64	14/64	17/64	500	"

Prices upon application.

WEATHERPROOF COPPER WIRE

No. 4 SOLID WEATHERPROOF

Fig. 27741A

No. 2 STRANDED WEATHERPROOF

Fig. 27741B

TRIPLE BRAID—SOLID CONDUCTOR

No.	Size American Wire Gauge (B. & S.)	Minimum Thickness Insulation Inches	Approximate Weights Pounds per 1000 Feet	Approximate Weights Pounds per Mile	Standard Packages Approximate Amount	Shipped on
2140	0000	.0781	767	4050	2400 Feet	Reels
2130	000	.0781	629	3320	2500 "	"
2120	00	.0781	502	2650	3200 "	"
2100	0	.0781	407	2150	4300 "	"
2101	1	.0781	316	1670	1000 "	"
2102	2	.0625	260	1370	1300 "	"
2103	3	.0625	199	1050	1600 "	"
2104	4	.0625	164	865	2100 "	"
2105	5	.0625	135	710	2500 "	"
2106	6	.0625	112	590	3400 "	"
2108	8	.0469	75	395	5000 "	"
2109	9	.0469	62	325	6000 "	"
2110	10	.0469	53	280	35 to 50 lbs.	Coils
2112	12	.0469	35	185	25 " 40 "	"
2114	14	.0469	25	130	25 " 40 "	"
2116	16	.0469	20	105	20 " 30 "	"
2118	18	.0469	16	85	20 " 30 "	"

TRIPLE BRAID—STRANDED CONDUCTOR

2350	*2000000	.1250	7008	37000	600 Feet	Reels
2351	*1750000	.1250	6193	32700	700 "	"
2352	*1500000	.1250	5380	28400	850 "	"
2353	*1250000	.1250	4508	23800	1000 "	"
2354	*1000000	.1250	3674	19400	1320 "	"
2357	*900000	.1094	3332	17600	1320 "	"
2359	*800000	.1094	2992	15800	1320 "	"
2360	*750000	.1094	2822	14900	1320 "	"
2361	*700000	.1094	2650	14000	1320 "	"
2363	*600000	.1094	2235	11800	1320 "	"
2365	*500000	.1094	1894	10000	1320 "	"
2367	*450000	.0938	1724	9100	1320 "	"
2368	*400000	.0938	1553	8200	1320 "	"
2369	*350000	.0938	1345	7100	2640 "	"
2370	*300000	.0938	1174	6200	2640 "	"
2371	*250000	.0938	985	5200	2640 "	"
2340	0000	.0781	800	4220	2000 "	"
2330	000	.0781	653	3450	2000 "	"
2320	00	.0781	522	2760	3000 "	"
2300	0	.0781	424	2240	3000 "	"
2301	1	.0781	328	1735	1000 "	"
2302	2	.0625	270	1425	1300 "	"
2303	3	.0625	206	1090	1600 "	"
2304	4	.0625	170	900	2100 "	"
2305	5	.0625	140	740	3000 "	"
2306	6	.0625	115	610	3400 "	"
2308	8	.0469	78	410	4000 "	"

*Circular mils, instead of Amer. Wire Gauge (B. & S.).

FLEXIBLE CORDS

Fig. 28039A

TYPE C LAMP CORD.— Single or twisted pair with cotton or silk braid over each conductor.

TYPE PO PARALLEL CORD.— Has cotton braid over each of two conductors laid parallel under cotton or silk outer braid.

TYPE P RE-ENFORCED CORD.—Has cotton braid over each conductor twisted together and covered with a rubber jacket, then braided over all with a hard glazed cotton.

TYPE PWP RE-ENFORCED CORD WP.—Same as Type P except outer braid is saturated and finished with a weatherproofed compound.

TYPE PS SPECIAL RE-ENFORCED CORD.—Underwriters only permit this cord in sizes Nos. 18 and 16 for office and dwelling only where appearance is essential.

Wall, $\frac{1}{64}$-inch, of New Code insulation with cotton braid over each conductor, twisted together and covered with a rubber jacket to make round, then braided over all with either silk or hard glazed cotton.

The conductors of the regular cords are composed of a number of 30 B. & S. bare annealed copper strands, grouped into a cable of the required capacity, as follows: No. 8 B. & S., 165 strands; No. 10 B. & S., 104 strands; No. 12 B. & S., 65 strands; No. 14 B. & S., 41 strands; No. 16 B. & S., 26 strands; No. 18 B. & S., 16 strands; No. 20 B. & S., 10 strands; No. 22 B. &. S, 7 strands. Sizes smaller than No. 18 are not approved by the Underwriters.

SEVEN POINTS TO COVER WHEN ODERING FLEXCORDS.

Amount	Size	Insulation	Conductors	Style	Finish	Color
Feet	B. & S. Gauge	New Code 1909 Code Commercial	Single Pair Triple	Lamp Cord Parallel Cord Re-enforced Cord Special Re-en. Cord Special Cord	Silk Cotton Weatherproofed	Use Standard Colors as per Braid Color Card
Examples						
500	18	New Code	Twisted Pr.	Lamp Cord	Silk	Green
250	20	Commercial	Single	" "	Cotton	Black
500	16	1909 Code	*	Parallel Cord	Silk	Brown
250	14	New "	*	Re-enforced Cord	Cotton	Black
250	16	1909 "	*	" "	Weatherproofed	†

*Pair conductor is always understood (unless otherwise specified) for parallel and re-enforced cords.

†Weatherproof finish is always black and need not be specified.

LIST OF COLORS

Cotton covered cords may be furnished in any of the following colors: Standard green and yellow, white, yellow, blue, maroon, green, oak, brown, red, black, gray, old gold.

Silk covered cords may be furnished in any of the following colors: White, silver, gilt, old gold, copper, bronze, tiffany green, dark green, red, maroon, yellow, gold, brass, old brass, green, olive green, light green, brown, navy blue, black.

WEIGHT, POUNDS PER 1000 FEET

Size	Insulation	Lamp Cords Cotton	Lamp Cords Silk	Parallel Cords Cotton	Parallel Cords Silk	Re-enforced Cords Cotton	Re-enforced Cords Silk	Re-enforced Cords W P.
12	New Code	83	79	85	82	178	172	187
12	$\frac{1}{64}$-in. Wall	60	52	64	56	108	104	114
14	New Code	63	59	65	62	133	128	141
14	$\frac{1}{64}$-in. Wall	37	35	40	3	79	75.5	85
16	New Code	37	34	38	36	75	70.5	80
16	$\frac{1}{64}$-in. Wall	26	24	27	25	52	49	57
18	New Code	27	25	29	27	64	60	69
18	$\frac{1}{64}$-in. Wall	19	17	20	18	43	40	47
20	New Code	22	19	23	21	51	47.5	56
20	$\frac{1}{64}$-in. Wall	13.5	12	14.5	13	32	29.5	36
22	New Code	18	16	19	17	43	39	48
22	$\frac{1}{64}$-in. Wall	10.5	9	11	10	26.5	24	30

CIRCULAR LOOM CONDUCTORS AND IRON CONDUIT

CIRCULAR LOOM

Fig. 15561A

Inside Diameter ..... inches	1/4	3/8	1/2	5/8	3/4	1
Feet, per Coil	250	250	200	200	150	100
Weight, pounds ..... per 1000 feet	75	110	125	155	200	275
Price ..... per foot	.06	.09	.12	.15	.18	.25
Inside Diameter ..... inches	1 1/4	1 1/2	1 3/4	2	2 1/4	....
Feet, per Coil	100	....	....	....	....	....
Weight, pounds ..... per 1000 feet	360	400	440	600	800	....
Price ..... per foot	.33	.40	.47	.55	.65	....

FLEXIBLE STEEL ARMORED CONDUCTORS

Twin Conductors, Type BX

Fig. 15561B

Size, B. & S. Gauge ..... number	14	12	10
Approximate feet per Coil	150–250	150–250	150–250
Price ..... per 1000 feet	104.00	135.00	185.00

STEEL ARMORED FLEXIBLE CORD

Type E

Size, B. & S. Gauge ..... number	18	16	14
Approximate feet per Coil	150–250	150–250	150–250
Price ..... per 1000 feet	58.00	65.00	95.00

RIGID UNLINED IRON CONDUIT

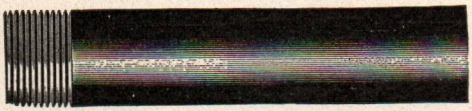


Fig. 15561C

When ordering, specify whether galvanized or enameled.

Standard Pipe Size ... inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Inside Diameter ..... inches	.62	.82	1.04	1.38	1.61	2.06	2.46	3.06	3.54	4.02
Outside " ..... "	.84	1.05	1.31	1.66	1.90	2.37	2.87	3.50	4.00	4.50
Weight, per 1000 feet . pounds	85	112	167	224	268	361	574	754	900	1066
Price ..... per 100 feet	8.50	11.50	17.00	23.00	27.50	37.00	58.50	76.50	92.00	109.00

PORCELAIN TUBES

Fig. 15669A

Length under Head Inches	Price, per 100 — Inside and Outside Dimensions of Tubes, Inches											
	5/16x9/16	3/8x11/16	1/2x13/16	5/8x15/16	3/4x1 3/16	1x1 7/16	1 1/4x1 13/16	1 1/2x2 1/4	1 3/4x2 9/16	2x2 15/16	2 1/4x3 6/16	2 1/2x3 11/16
1/2	1.3	1.5	....	....	....	....	....	....	....	....	....	....
1	1.3	1.5	2.1	2.7	3.9	5.9	....	....	....	....	....	....
1 1/2	1.4	1.8	2.2	2.8	4.3	6.9	....	....	....	....	....	....
2	1.5	1.9	2.6	3.4	5.5	7.8	....	....	....	....	....	....
2 1/2	1.6	2.2	3.0	4.0	6.5	9.1	12.2	15.6	19.8	23.4	26.8	30.3
3	1.8	2.6	3.4	4.7	7.2	10.4	13.8	17.4	22.0	25.8	29.6	32.5
4	2.7	3.2	4.1	5.5	8.8	13.0	15.6	19.2	23.9	27.7	31.5	35.3
5	3.3	3.8	4.8	6.4	10.4	16.3	18.1	25.3	34.1	41.7	48.8	56.8
6	4.0	4.8	5.5	7.3	12.4	18.6	20.0	31.2	45.3	57.9	70.5	83.2
8	7.2	8.4	9.6	10.8	15.6	21.8	24.0	38.4	58.1	73.9	89.8	105.6
10	9.7	10.8	12.0	18.0	21.8	25.0	31.2	45.6	66.0	81.8	97.7	113.5
12	14.4	15.6	16.8	24.0	28.1	34.3	45.6	69.2	102.1	128.0	154.0	180.0
14	24.2	27.7	31.1	43.2	49.5	54.0	76.1	117.5	174.8	220.4	266.2	311.8
16	34.7	38.9	43.2	51.9	58.5	67.4	90.0	131.4	190.1	235.8	281.4	326.9
18	38.9	43.2	51.9	60.5	67.4	76.4	103.7	147.2	228.4	280.9	333.2	385.3
20	43.2	47.6	56.3	64.8	71.9	85.3	114.1	162.5	253.7	331.0	369.1	427.1
22	49.7	54.0	60.5	69.2	81.0	92.2	124.4	178.0	277.9	342.1	406.4	470.8
24	56.3	60.5	64.8	73.5	90.0	100.0	134.8	193.6	302.8	373.3	443.9	514.2

For glazed tubes, add 50 per cent to net prices. For split, split floor, and split crossover tubes, multiply list by 10. For floor, curved, and curved end tubes, multiply list by 6. For headless tubes, multiply list by 4. All measurements should be computed over all except split tubes, which should be taken under head, and crossover tubes, which should be taken between heads.

STANDARD INSULATORS

No. 4

Fig. 15669B

No. 4 1/2

Fig. 15669C

No. 5 1/2

Fig. 15669D

SPLIT INSULATORS

No. T-5 1/2

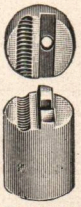


Fig. 15669E

ROUND REVERSIBLE No. 5517

Fig. 15669F

SQUARE REVERSIBLE No. 55 1/2

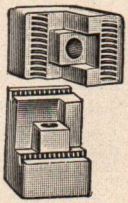


Fig. 15669G

STANDARD INSULATORS

No.	Height	Diameter	Hole	Groove	Standard Package	Price per 1000
	Diameter, Inches					
4	1 11/16	1 1/2	3/8	3/8	2200	22.00
4 1/2	1 7/8	1 1/2	3/8	7/16	1900	25.00
5 1/2	1 9/16	1	1/4	5/16	5300	13.00

SPLIT INSULATORS

No.	Number of Grooves	For Size Wire	Standard Package	Price per 1000	Number of Grooves	Number of Grooves	For Size Wire	Standard Package	Price per 1000
T-5 1/4	1.	12–14	3250	22.70	55 1/2 Sq.	2	12–14	3700	32.00
5517 Rd.	2	12–14	3700	32.00	45 1/2 "	2	8–10	2000	48.00
5135 "	2	8–10	1400	48.00	35 1/2 "	2	4– 6	1000	69.00
5147 "	2	4– 6	1000	69.00	.....	..	....	....	.....

ELECTRICAL SUPPLIES

PORCELAIN CLEATS

No. 1

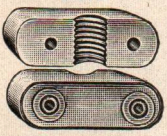


Fig. 31141A

No. 1A

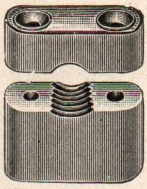


Fig. 31141B

ONE-WIRE GLAZED

No.	Dimensions, Inches: Length	Width	Groove	Hole	Price, per 1000 Pairs
1	1 5/16	3/4	3/16	1/4	**28.00**
1A	1 5/16	3/4	3/16	1/4	**39.00**
2	2 1/4	15/16	1/4	1/4	**43.00**
2A*	2 1/4	15/16	1/4	1/4	**54.00**
3	9 9/16	1 1/8	7/16	1/4	**52.00**
3A*	2 9/16	1 1/8	7/16	1/4	**65.00**
4	2 11/16	1 1/4	1/2	1/4	**65.00**
4A*	2 11/16	1 1/4	1/2	1/4	**78.00**
5	3	1 5/16	9/16	1/4	**86.00**
5A*	3	1 5/16	9/16	1/4	**103.00**
6A*	3 3/8	1 3/8	3/4	3/8	**130.00**
7A*	3 13/16	1 7/16	1	3/8	**173.00**
8A*	4 3/4	1 5/8	1 3/8	3/8	**346.00**
8 1/2A*	5	2	1 1/4	3/8	**432.00**
9A*	5	2	1 1/2	3/8	**432.00**

*Style A carry wires 1 inch over wiring surface.

No. 334

Fig. 31141C

TWO-WIRE

No.	Dimensions, Inches: Ht.	Width	Lgth.	Groove	Price, per 1000 Pairs
334*	1 1/8	11/16	3 1/4	3/16	**34.00**
334†	1 1/8	11/16	3 1/4	3/16	**21.00**
THREE-WIRE					
337*	1 1/8	11/16	3 1/4	3/16	**34.00**
337†	1 1/8	11/16	3 1/4	3/16	**21.00**

*Glazed. †Unglazed.

TESTED FUSE WIRE

Capacity . . amps.	1	2	3, 5	6	10, 12
Price . . . . . per lb.	**1.10**	**1.05**	**1.00**	**.85**	**.80**

Capacity . . amps. 15, 20, 25, 30, 35, 40, 45, 50
Price . . . . . per lb. **.75**
Capacity . . amps. 60, 70, 75, 80, 90, 100
Price . . . . . per lb. **.70**

TESTED FUSE STRIPS

Furnished in 5 and 10-pound tin boxes.
Price . . . . . per foot . . . .

ATTACHMENT PLUGS

No. 903 BENJAMIN ROTATING PLUG

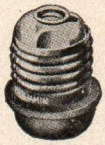


Fig. 31141D

No. 345 MOULDED FUSELESS PLUG

Fig. 31141E

No. 1009 ENAMELED WOOD FUSELESS PLUG

Fig. 31141F

No. 5406 HUBBELL PORCELAIN CAP PLUG

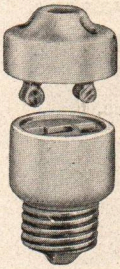


Fig. 31141G

No.	Price Each	No.	Price Each
903	**.25**	1009	**.12**
345	**.44**	5406	**.30**

TERMINAL LUGS

TYPE N FOR FRONT CONNECTIONS

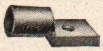


Fig. 31141H

No.	Amps.	Capacity Wire Hole No.	Size of Wire Hole Inches	Price Each: Plain	Polished
1245	30	*7	3/16	**.03**	**.06**
1246	60	*5	1/4	**.06**	**.10**
1248	100	*1	3/8	**.14**	**.21**
1249	200	*0000	9/16	**.24**	**.35**
1250	300	†300,000	11/16	**.42**	**.62**
1251	400	†475,000	7/8	**.76**	**1.00**
1252	600	†750,000	1 3/32	**1.06**	**1.30**
1253	800	†1,000,000	1 1/4	**2.10**	**2.50**
1254	1000	†1,400,000	1 1/2	**2.40**	**2.90**

*B. & S. gauge. †C. M. cable.

ELECTRICAL SUPPLIES

FUSE PLUGS

Fig. 30970A

Price, Fuse Plugs, any Amperage .....each ....

PLUG CUT-OUTS

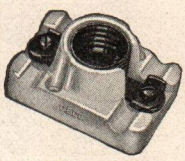


Fig. 30970D

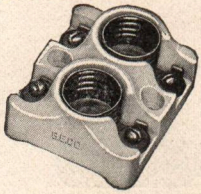


Fig. 30970E

Price, Single-pole Main.....each ....
" Double " " ..... " ....

ROSETTES

FUSELESS—250 VOLTS

TWO-PIECE

Fig. 30970B

ONE-PIECE

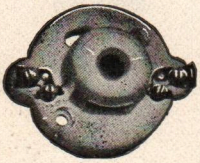


Fig. 30970C

Price, Two-piece Concealed Base Rosettes.....each ....
Price, One-piece Open Rosettes. " ....

PLUG CUT-OUTS

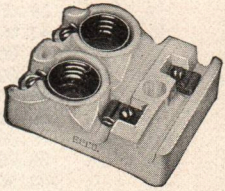


Fig. 30970F

Price, Double-pole Single Branch ....each ....

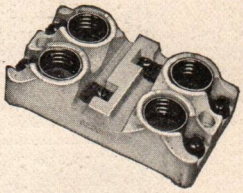


Fig. 30970G

Price, Double-pole, Double Branch .... each ....

BROOKFIELD GLASS INSULATORS

No. 37

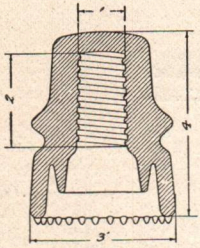


Fig. 30970H

No.	Diam. Groove Inches	Ave. Wt. Oz.	Number per Barrel	Approx. Wt. per 1000 Packed, Lbs.	Style
9	1/4	10	350	750	Pony
10	1/4	10	350	750	"
11	..	10	700	400	Local Distributing Lines
31	1/4	10	340	760	Pony, Double Groove
32	7/16	12	275	950	" " Petticoat
30	1/4	14 1/2	225	1000	Local Distributing Lines
36	5/8	20	175	1450	Deep Groove, Double Petticoat
37	5/8	20	175	1450	" " " "
27	..	18	175	1375	Wide Deep Groove, Double Petticoat
38	13/16	19	165	1375	Extra " " " "
40	1/4	15	250	1100	Regular
41	1/2	17	200	1275	Deep Groove
*48	..	..	200	1550	Long Distance

Nos. 10 and 37 are made with drip points. Nos. 31, 32 and 38 are made with or without drip points.

*Used by (Western Union Telegraph Co.,) The American Telephone and Telegraph Co., and Federal Railroads on their long distance lines.

Prices upon application.

BRYANT WEATHERPROOF SOCKETS

PORCELAIN SOCKETS

No. 399

Fig. 27746A

No. 9366

Fig. 27746B

Number	*399	†*9366
Price ..... each	.12½	.20

†For shade holder.

BRAGDON SOCKETS

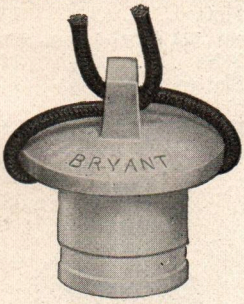


Fig. 27746C

Extension edge carries the drip away from lamp and socket. Method of wiring at top removes strain from socket itself and places it on porcelain. Extra hole in porcelain at top allows for independent suspension, if desired.

Price, *No. 50997 ..... each **.50**

HARD RUBBER SOCKETS

Price, No. 50788 ..... each **1.00**

MOLDED SOCKETS

Price, No. 43310 ..... each **.22**

The above weatherproof sockets are fitted with 6 inches of No. 14 B. & S. stranded rubber covered wire.

Sockets with longer wires furnished on special order. Extra charge, 9 cents list per foot.

* New Wrinkle Emergency Shade Holders may be attached to these sockets.

COMPOSITION SOCKETS

No. 60666

Fig. 27746D

Price ..... each **.24**

Fitted with 6 inches of No. 14 B. & S. stranded rubber covered wire.

MOLDED BRACKET SOCKETS

Fig. 27746E

Wires inside of pipe — 660 watts, 250 volts.

Number	43311	43312
Socket ..... inches	⅛	⅜
Price ..... each	**.60**	**.60**

Wires outside of pipe — 660 watts, 600 volts.

Number	43313	43314
Socket ..... inches	⅛	⅜
Price ..... each	**.60**	**.60**

PORCELAIN BRACKET SOCKETS

Cap is a brass casting, brush brass finish and fitted with steel set screw.

660 Watts, 250 Volts

Number	*9448	*9496
Socket ..... inches	⅛	⅜
Price ..... each	**.60**	**.60**

* New Wrinkle Emergency Shade Holders may be attached to these sockets.

The above sockets are fitted with 6 inches of No. 18 B. & S. solid rubber-covered fixture wire. Sockets with longer wires furnished on special order. Extra charge, 9 cents list per foot.

PERKINS SWITCHES

SINGLE-POLE SWITCHES

No. 2000

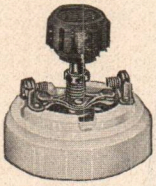


Fig. 27743A

No. 2001

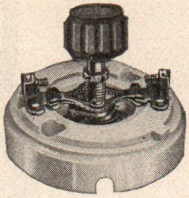


Fig. 27743B

SMALL SIZE

5 Amp., 125 Volts—3 Amp., 250 Volts

No.	Description	Outside Diam. of Base Inches	Sup. Screws Centered Inches	Price Each
2000	Slotted.....	2	1⅜	.28
*2220	Solid.....	2	1⅜	.28
2047	Slotted, Ind..	2	1⅜	.32
*2035	Solid, Ind.....	2	1⅜	.32

LARGE SIZE

5 Amp., 125 Volts—3 Amp., 250 Volts

2170	Solid.....	2¼	1½	.36
2002	Slotted.....	2¼	1½	.36
2254	Solid, Ind..	2¼	1½	.40
2255	Slotted, Ind.	2¼	1½	.40

10 Amp., 125 Volts—5 Amp., 250 Volts

2001	Slotted....	2 7/16	1 23/32	.48
†2221	Solid.....	2 7/16	1 23/32	.48
2048	Slotted, Ind.	2 7/16	1 23/32	.54
†2036	Solid, Ind...	2 7/16	1 23/32	.54

THREE-POINT SWITCHES

No. 2455

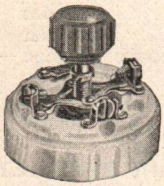


Fig. 27743C

3 Amp., 125 Volts—1 Amp., 250 Volts

*2455	Solid.....	2	1⅜	.48
2456	Slotted.....	2	1⅜	.48

*These switches can also be furnished on a base measuring 1¾ inches in diameter, which is likewise the diameter of the cover.

†These switches can also be furnished on a base measuring 2¼ inches in diameter, which is likewise the diameter of the cover.

THREE-POINT SWITCHES

No. 2175

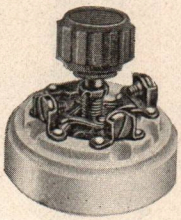


Fig. 27743D

No. 2176

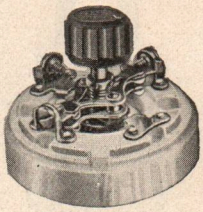


Fig. 27743E

5 Amp., 125 Volts—3 Amp., 250 Volts

No.	Description	Outside Diam. of Base Inches	Sup. Screws Centered Inches	Price Each
2175	Solid.....	2¼	1½	.56
2027	Slotted.....	2¼	1½	.56

10 Amp., 125 Volts—5 Amp., 250 Volts

†2176	Solid.....	2 7/16	1 23/32	.76
2030	Slotted.....	2 7/16	1 23/32	.76

FOUR-POINT SWITCHES

No. 2183

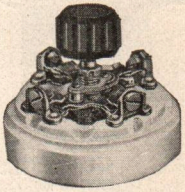


Fig. 27743F

Four-point switches are used in connection with two 3-point switches where current is to be controlled from any one of more than 2 points. A 4-point switch is installed between the 3-point switches at each additional point.

Four-point switches can also be used individually as pole-changing switches.

5 Amp., 125 Volts—2 Amp., 250 Volts

†2183	Solid.....	2 7/16	1 23/32	.86
2033	Slotted....	2 7/16	1 23/32	.86

†These switches can also be furnished on a base measuring 2¼ inches in diameter, which is likewise the diameter of the cover.

NOTE.—Any of these switches can be converted into a lock switch by removing the handle and substituting Universal Lock Attachment.

BRYANT PORCELAIN CLEAT RECEPTACLES

No. 9171

Fig. 27742A

No. 9394

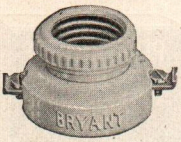


Fig. 27742B

Supported by one screw in the center.

Number....	*‡9171	*‡9394	*‡50757
Price...each	.10	.20	.20

No. 50757 has copper fittings and screws.

No. 50715

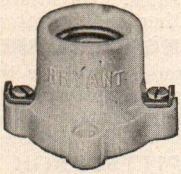


Fig. 27742C

Sup. Screws Centered.....inches	1 15/16
Price, *No. 50715, Pony.....each	.15

No. 59275

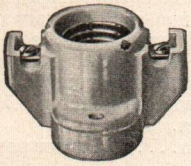


Fig. 27742D

Sup. Screws Centered.....inches	2
Price, *No. 59275. 1 inch Separation .....each	.18

No. 9402

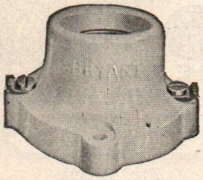


Fig. 27742E

Sup. Screws Centered.....inches	2 3/8
Price, *No. 9402.....each	.15

* New Wrinkle Emergency Shade Holders may be attached to these receptacles.

‡ Not National Electrical Code Standard.

No. 4013

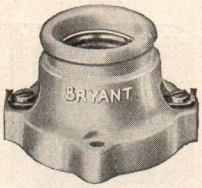


Fig. 27742F

No. 28795

Fig. 27742G

Number.....	*4013	*28795
Sup. Screws Centered.in.	2 3/8	1 7/8
Price.....each	.20	.15

No. 4013 is for weatherproof shade holders.

No. 9403

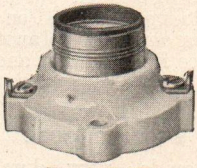


Fig. 27742H

Has brass ring for standard shade holders.

Sup. Screws Centered.....inches	2 3/8
Price No. 9403.....each	.25

No. 58301

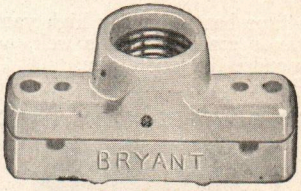


Fig. 27742J

Sup. Screws Centered.....inches	1 1/16
Price, *No. 58301.....each	.25

No. 58300

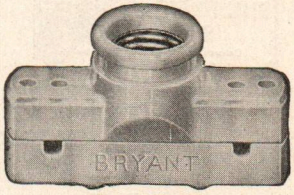


Fig. 27742K

For weatherproof shade holders.

Sup. Screws Centered.....inches	1 1/16
Price, *No. 58300.....each	.30

INSULATING TAPES

FRICTION TAPE

WESTINGHOUSE

Fig. 31029A

IXL

Fig. 31029B

These friction tapes are remarkably smooth, free from ravelings, and easily handled. Double calendered and double spread, insuring against pin holes. The compound does not come off on hands nor transfer from one layer to another. The tapes are free from sulphur and are non-corrosive.

WESTINGHOUSE

Highest grade, very durable, long yardage. Used for generator and motor work. Unequalled for railway motor repairs.

Price, ¾-inch.....per pound **1.36**

IXL

This tape has unusually high yardage. Withstands grease and oils well, and is recommended for general use.

Price, ¾-inch.....per pound **1.06**

SPLICING COMPOUND

Fig. 31029D

CABLE TAPE

Fig. 31029E

SPLICING COMPOUND

Thoroughly waterproof and perfect insulating mediums. Not injured by exposure to weather. Does not deteriorate.

WESTINGHOUSE SPECIAL

Highest grade. Used for the most severe conditions. Has as high dielectric strength as the insulation on the wire.

Price, ¾-inch.....per pound **1.22**

PITTSBURGH

Medium grade for less severe conditions.

Price, ¾-inch.....per pound **.92**

CABLE TAPE

A perfect insulation. Acid, alkali, and waterproof, non-corrosive, always flexible. Affords both mechanical and dielectric protection. Recommended particularly for high-voltage lines, in mines, in subways and for submarine splicing. 75 feet per roll, 10 ounces.

Price, ¾-inch.....per pound **1.04**

MASSCO FRICTION TAPE

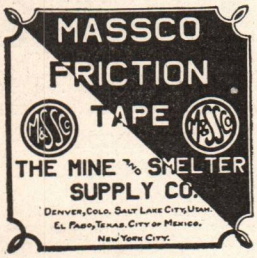


Fig. 31029C

USEIT SPLICING COMPOUND

Fig. 31029F

MASSCO FRICTION TAPE

Trade No.	Color	Width Inches	Pounds per Roll	Price per Pound
37437	Black	¾	½	.98

USEIT SPLICING COMPOUND

37440	Black	¾	½	.84

COLUMBIA DRY BATTERIES

COLUMBIA IGNITOR

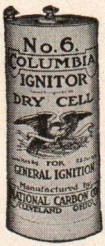


Fig. 19305A

Ignitors should be ordered where a battery is needed for any sort of heavy service. As their name shows, they are particularly adapted for automobiles, stationary engines and traction ignition, where their long life, ability to stand up under heavy current drains, and give a hot, heavy spark after most batteries would have been exhausted, make them particularly economical.

Every cell is tested five times before it reaches the consumer's hands, insuring fresh batteries.

Size.....inches	2½x6	3x7	3½x8
Price.....each	.45	.75	.95

RED LABEL COLUMBIA

Fig. 19305B

It is often desirable to have a battery that can be used for every sort of service. The Red Label Columbia fills this need.

As an ignition cell it is surpassed only by the Columbia Ignitor described above. For lighter service demanded by telephones, household uses and the like, it is not surpassed.

The long shelf life and freedom from serious deterioration when idle make the Columbia particularly economical and reliable. It is ready for service when it is wanted.

Size.....inches	1½x4	2x5	2½x6	3x7	3½x8
Price.....each	.35	.40	.45	.70	.90

DUPLEX

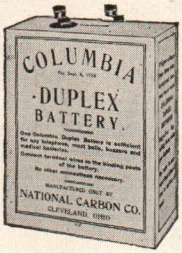


Fig. 19305C

The Columbia Duplex is a 3-volt, unit battery, put up in an attractive red pasteboard carton tightly sealed at both ends. It has many advantages over two loosely connected dry cells for general service and does away with the necessity of connecting cells together. There are but two binding posts, and anyone can connect two wires and not go wrong. They can be sent by parcel post in durable cartons made especially for this purpose.

Price, 5⅛x2⅝x6¾ inches.....each ..
" Corrugated Individual Mailing Cartons..... " .06

HOT SHOT

Fig. 19305D

Soldered copper strips connect the individually tested cells, which are entirely surrounded by a waterproof insulating compound. Loose connections and rattling cells are done away with. For lighting service it gives a longer life than cells loosely connected. Is satisfactory for carriage lighting outfits.

Size..inches	5 3/16x5 3/16x7½	8x5x7½	10⅝x5⅜x7½	13¼x5⅜x7½
Voltage....	3	7½	6	7½
Price.....	2.05	2.55	4.70	5.15

MULTIPLE

Fig. 19305E

Waterproof, accident-proof, economical and convenient.

Type 266—for Atwater Kent Device or Delco System, or any single spark ignition system. Type 356—for all ignition systems using standard coils and timers with a battery of 5 or 6 dry cells used in a single series set. Type 536—for magneto dual system, systems now using 4 volts or 2-cell storage batteries, stationary and motor boat engines equipped with 4, 5, or 6 Edison or closed circuit batteries. Type 346—for any 4 to 6-volt service. Type 436—for heavy 3½ to 4-volt service. Type 256—for light 6 to 7-volt service. Type 246—for light 4 to 6-volt service.

Type.....	266	356	536	346	436	256	246
Price.....each	6.60	8.25	8.25	6.60	6.60	5.50	4.40

SWITCHES

TYPE C

250 VOLTS D. C. AND 500 VOLTS A. C.—FRONT CONNECTED PLAIN FINISH

THREE-POLE, SINGLE-THROW, LOW JAWS

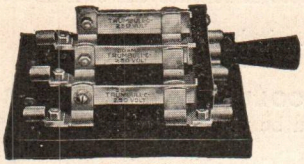


Fig. 17288A

DOUBLE-POLE, SINGLE-THROW FUSES AT BOTTOM, HIGH JAWS

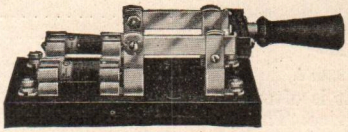


Fig. 17288B

Cap. Amps.	Single-Pole Cat. No.	Single-Pole Price Each	Double-Pole Cat. No.	Double-Pole Price Each	Three-Pole Cat. No.	Three-Pole Price Each	Four-Pole Cat. No.	Four-Pole Price Each
SINGLE-THROW, NOT FUSED, LOW JAWS								
*30	3001	.42	3041	.68	3081	1.02	5901	1.36
30	3002	.66	3042	1.06	3082	1.60	5902	2.14
60	3003	.74	3043	1.22	3083	1.84	5903	2.44
100	3005	1.50	3045	2.50	3085	3.76	5905	5.00
200	3006	2.70	3046	4.50	3086	6.76	5906	9.00
DOUBLE-THROW, NOT FUSED, LOW JAWS								
*30	3021	.76	3061	1.16	3101	1.80	5921	2.56
30	3022	1.16	3062	1.70	3102	2.66	5922	3.84
60	3023	1.30	3063	2.00	3103	3.10	5923	4.40
100	3025	2.94	3065	4.50	3105	6.90	5925	9.80
200	3026	4.88	3066	7.50	3106	11.60	5926	15.50
SINGLE-THROW, FOR N. E. C. FUSES AT BOTTOM, HIGH JAWS								
30	1120	.70	1130	1.06	1140	1.60	1150	2.12
60	1121	1.18	1131	1.80	1141	2.70	1151	3.60
100	1123	2.38	1133	3.66	1143	5.50	1153	7.30
200	1124	4.40	1134	6.76	1144	10.14	1154	13.50
SINGLE-THROW, FOR N. E. C. FUSES AT TOP, HIGH JAWS								
30	1160	.70	1170	1.06	1180	1.60	1190	2.12
60	1161	1.18	1171	1.80	1181	2.70	1191	3.60
100	1163	2.38	1173	3.66	1183	5.50	1193	7.30
200	1164	4.40	1174	6.76	1184	10.14	1194	13.50

250 VOLTS D. C. AND A. C.—FRONT CONNECTED—PLAIN FINISH

DOUBLE-THROW, FOR N. E. C. FUSES, HIGH JAWS								
30	3131	1.54	3151	2.20	3171	3.52	3191	4.84
60	3132	2.38	3152	3.40	3172	5.44	3192	7.48
100	3134	5.18	3154	7.40	3174	11.84	3194	16.28
200	3135	9.80	3155	13.00	3175	20.80	3195	26.60

*For 250 volts D. C. only.
Unmounted switches, without slate bases, deduct 10 per cent.
125-volt switches same price as 250-volt.
All four-pole switches are regularly equipped with spade handles.
All Type C switches are for front connections, plain finish only.
No fuses included in above prices.

SWITCHES

TYPE C.

500 VOLTS A. C.—FRONT CONNECTED—PLAIN FINISH

THREE-POLE, SINGLE-THROW
FUSES AT BOTTOM, HIGH JAWS

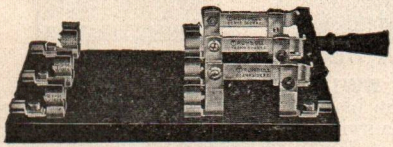


Fig. 17289A

DOUBLE-POLE, SINGLE-THROW
LOW JAWS WITH QUICK BREAK ATTACHMENT

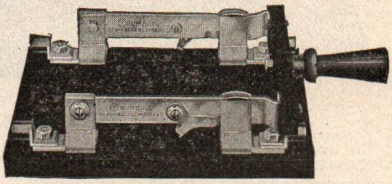


Fig. 17289B

SINGLE-THROW FOR N. E. C. FUSES AT BOTTOM, HIGH JAWS

	Three-pole		Four-pole			Three-pole		Four-pole	
Cap Amps.	Cat. No.	Price Each	Cat. No.	Price Each	Cap Amps.	Cat. No.	Price Each	Cat. No.	Price Each
30	9880	2.80	9900	3.70	100	9883	7.00	9903	9.30
60	9881	3.50	9901	4.80	200	9884	12.20	9904	16.28
SINGLE-THROW FOR N. E. C. FUSES AT TOP, HIGH JAWS									
30	9920	2.80	9940	3.70	100	9923	7.00	9943	9.30
60	9921	3.50	9941	4.80	200	9924	12.20	9944	16.20
DOUBLE-THROW FOR N. E. C. FUSES, HIGH JAWS									
30	9850	6.00	9870	8.00	100	9853	14.00	9873	18.60
60	9851	7.40	9871	9.80	200	9854	21.50	9874	28.60

251-600 VOLTS D. C. AND 501-600 VOLTS A. C.—FRONT CONNECTED—PLAIN FINISH

EQUIPPED WITH QUICK BREAK ATTACHMENTS

SINGLE-THROW, NOT FUSED LOW JAWS

	Single-pole		Double-pole		Triple-pole		Four-pole	
Cap. Amps.	Cat. No.	Price Each	Cat. No.	Price Each	Cat. No.	Price Each	Cat. No.	Price Each
30	6600	1.08	6620	1.80	6640	2.80	6655	3.80
60	6601	1.20	6621	2.00	6641	3.10	6656	4.20
100	6603	2.16	6623	3.60	6643	5.60	6657	7.50
200	6604	4.20	6624	7.00	6644	10.86	6658	14.70

WITHOUT QUICK BREAK ATTACHMENTS

SINGLE-THROW, NOT FUSED, LOW JAWS

30	3200	.80	3240	1.34	3280	2.10	3305	2.80
60	3202	.96	3242	1.60	3282	2.50	3306	3.30
100	3204	1.90	3244	3.16	3284	4.90	3307	6.60
***DOUBLE-THROW, NOT FUSED, LOW JAWS**								
30	3220	1.66	3260	2.20	3300	3.70	3315	5.00
60	3222	1.90	3262	2.60	3302	4.30	3316	6.00
100	3224	3.90	3264	5.20	3304	8.60	3317	12.00

*Double-throw switches, Type C, with quick break attachments, are not made. Use Type A.

Unmounted switches, without slate bases, deduct 10 per cent.

All fusible 500-volt A. C. switches arranged for 600-volt fuses.

All three and four-pole switches, 600 volts, regularly equipped with spade handles.

All Type C switches are for front connections, plain finish only.

No fuses included in above prices.

All double-throw fusible switches regularly equipped with high jaws.

The National code requires that switches designed for over 250 volts D. C. be provided with quick break attachments above 100 amperes, and recommends them on 100 amperes and below.

SWITCHES AND SWITCH BOXES

MOTOR STARTING SWITCHES
TYPE C, FRONT CONNECTED, 250 VOLTS

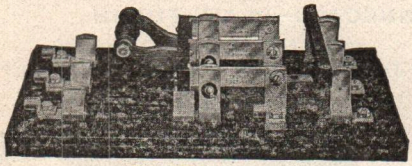


Fig. 17287A

IGNITION SWITCHES

No. 708

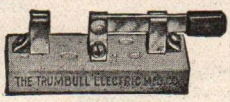


Fig. 17287B

No. 712

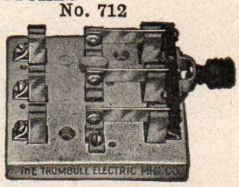


Fig. 17287C

MOTOR STARTING SWITCHES

The motor is started on unfused contact; the blades are to be held against spring pressure for a few seconds until speed is up, when switch is thrown into fused end which carries normal load.

The two outgoing ends of front connected switch are connected on back by copper straps, placed in grooves in slate, so that load can be taken from either end of switch. Thus only six wires (three incoming and three outgoing) are needed on a three-pole switch, eight wires on a four-pole, etc.

Switches are marked Start and Run to assist in avoiding error by throwing into the wrong contact.

Back connections are on slate base, mounted on corner feet of iron. Wires on back.

FOR N. E. C. FUSES ON ONE END ONLY—PLAIN FINISH
TYPE C FRONT CONNECTED
FOR 250 VOLTS D. C. OR A. C.

Cap. Amps.	Double-pole, Double-throw Cat. No.	Price Each	Three-pole, Double-throw Cat. No.	Price Each	Four-pole, Double-throw Cat. No.	Price Each
30	1350	**3.75**	1355	**5.00**	1360	**6.68**
60	1351	**4.75**	1356	**6.30**	1361	**8.40**
100	1353	**9.90**	1358	**13.20**	1363	**17.60**
			FOR 500 VOLTS A. C.			
30	1370	**4.50**	1375	**6.00**	1380	**8.00**
60	1371	**5.60**	1376	**7.50**	1381	**10.00**
100	1373	**10.90**	1378	**14.50**	1383	**19.30**

IGNITION OR BATTERY SWITCHES

All ignition or battery switches are fitted with the return bend, self-adjusting type of clip, which is unusually suitable for this type of switch. Projections on posts prevent turning on bases.

25 AMPERES—FRONT CONNECTIONS
PORCELAIN BASE

Cat. No.	Style	Size of Base, In. Length	Width	Carton	Std. Pkg.	Wt. Lbs. Std. Pkg.	Price Each
707	S. P., S. T	1⅛	x 3⅛	10	150	48	**.20**
708	S. P., D. T.	1⅜	x 3⅞	5	100	45	**.32**
709	D. P., S. T.	2	x 2⅝	10	100	50	**.35**
710	D. P., D. T.	2⅝	x 3⅞	5	50	46	**.50**
711	3 P., S. T.	3¼	x 2⅝	5	50	45	**.56**
712	3 P., D. T.	3¼	x 3⅞	5	50	67	**.90**

ROUND WOOD SWITCH

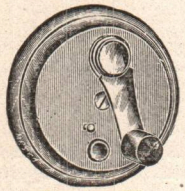


Fig. 17287D

ROUND WOOD SWITCHES

Number of Points.....	1	2	3
Diameter.....inches	2¼	2¼	2¼
Price.....each	**.14**	**.16**	**.18**

The bases of these switches are made in oak, ash, cherry or walnut.

PORCELAIN SWITCH BASES

Price, No. 16, for Concealed or Cleat Work.....each **.C5**

PORCELAIN SWITCH BASE

Fig. 17287E

WESTINGHOUSE MOTORS

CS SQUIRREL CAGE INDUCTION MOTORS

CONSTANT SPEED, ¼ TO 650 HORSE POWER, 110 TO 2200 VOLTS

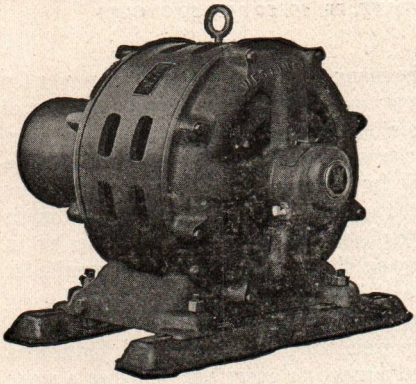


Fig. 16063A

These motors are suitable for constant speed service and are therefore applicable for driving machinery in nearly every industry.

All motors listed will operate continuously at full rating without injury on 10 per cent higher or lower than rated voltage.

The stators of Type CS motors up to and including Class 500 are of the built-up type; larger motors have forged steel or cast iron frames. Forged open-hearth steel is used wherever possible in these motors on account of its excellent magnetic qualities and great mechanical strength.

The rotor is practically indestructible. The rotor bars and end rings are formed into a continuous metallic circuit that is mechanically and electrically perfect.

In sizes above 5 horse power, the stator coils are form-wound and completely insulated before being installed. Open slots greatly facilitate repairing the stator windings.

The bearings are dust-proof and are larger than is customary on motors of corresponding sizes, thus insuring long life and uninterrupted service. Standard bearings are bronze bushings for the small motors and babbitt-lined sleeves for the larger sizes.

Bedplates, slide rails, extended shafts and outboard bearings can be supplied. Two-bearing motors can be furnished for wall or ceiling mounting.

The efficiency and power factor are unusually high at full load. The efficiency at fractional loads is almost as high as at full load. The overload capacity of these motors is also extremely high.

					Paper Pulleys			
					†Standard		Special	
H. P.	No. of Poles	Standard Voltages*	Full Load Speed R. P. M.	Frame No.	Diam. Inches	Face Inches	Min. Diam. Inches	Max. Face Inches
2	2	110–220–440–550	1450	231	4	3	3	5
2	4	110–220–440–550	715	250	4	4	3½	5
2	6	110–220–440–550	480	356A	5	4½	4	8
3	2	110–220–440–550	1450	241	4	4	3	5
3	4	110–220–440–550	715	354A	5	4½	4	8
3	6	110–220–440–550	480	444	7	6	4	10
5	2	110–220–440–550	1450	351	4	4	4	5
5	4	110–220–440–550	715	453	7	6	4	10
5	6	110–220–440–550	480	466A	8	7	6	10
7½	2	220–440–550	1450	371A	5	4½	4	8
7½	4	220–440–550	715	471A	8	7	6	10
7½	6	220–440–550	480	556	9	8	8	10
10	2	220–440–550	1450	463.5	7	6	4	10
10	4	220–440–550	715	563	9	8	7	10
10	6	220–440–550	480	572	9	8	9	10

*All voltages listed are for 25-cycle 2 or 3-phase, except 550 volts, which are for three-phase only. Details of 60-cycle motors furnished on request.

†Under no circumstances are motors guaranteed, if operated with pulleys smaller than those listed above.

WESTINGHOUSE MOTORS

TYPE AR SINGLE PHASE

½ TO 10 HORSE POWER, 110 AND 220 VOLTS, 25, 40, 50 AND 60 CYCLES

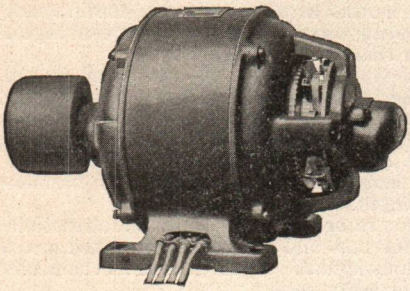


Fig. 15978A

The many advantages of electric power for small machines have led to a very general use of small motors and electric lights from the same power circuit. This possibility of combining the demands for light and power in one circuit has permitted central stations to supply customers by single-phase lines not only in the cities but in the outlying districts where separate circuits for power and light would be very wasteful. Accordingly the motor which can be operated successfully from the same circuit with lights is a great advantage to every one who has a small machine to turn or needs a light at night

60 CYCLES

H. P.	No. of Poles	Approx. Full Load Speed R.P.M.	Std. Pulley Diam. x Face Inches	Complete Motor Ship. Wt., Lbs.	Complete Motor Price Each	Add for Rheostat Ship. Wt., Lbs.	Add for Rheostat Price Each	Deduct for Omission of Sliding Base Ship. Wt., Lbs.	Deduct for Omission of Sliding Base Price Each	Deduct for Omission of Pulley Ship. Wt., Lbs.	Deduct for Omission of Pulley Price Each
½	4	1740	3½x2½	105	**130.00**	..	.....	20	**8.00**	2	**2.00**
½	6	1160	3½x2½	150	**145.00**	..	.....	20	**9.00**	2	**2.00**
¾	4	1750	3½x2½	155	**145.00**	..	.....	20	**9.00**	2	**2.00**
¾	6	1160	3½x2½	165	**180.00**	..	.....	20	**9.00**	2	**2.00**
1	4	1750	3½x2½	165	**165.00**	35	**26.00**	20	**9.00**	2	**2.00**
1	6	1160	3½x3	180	**200.00**	35	**26.00**	20	**8.00**	2	**2.00**
1½	4	1750	3½x3	180	**205.00**	35	**26.00**	20	**8.00**	2	**2.00**
2	4	1750	4 x3	265	**230.00**	35	**26.00**	25	**9.00**	5	**4.00**
2	6	1160	4 x4	310	**285.00**	35	**26.00**	25	**9.00**	5	**4.00**
3	4	1750	4 x4	310	**290.00**	35	**26.00**	25	**8.00**	5	**4.00**
3	6	1160	5 x4½	510	**360.00**	35	**26.00**	35	**12.00**	* 5	**4.00**
5	4	1750	5 x4½	510	**380.00**	35	**40.00**	35	**12.00**	* 5	**4.00**
5	6	1160	7 x6	705	**480.00**	35	**40.00**	50	**16.00**	*10	**6.00**
7½	4	1750	7 x6	705	**470.00**	40	**45.00**	50	**16.00**	*10	**6.00**
7½	6	1160	7 x6	705	**600.00**	40	**45.00**	50	**16.00**	*10	**6.00**
10	4	1750	7 x6	705	**570.00**	50	**60.00**	50	**16.00**	*10	**6.00**
10	6	1160	7 x6	825	**710.00**	50	**60.00**	50	**16.00**	*10	**6.00**

Prices on 25, 40 and 50-cycle motors quoted on application.

*Provided with slide rails, instead of sliding base.

PORTABLE LAMP GUARDS

CRESCENT

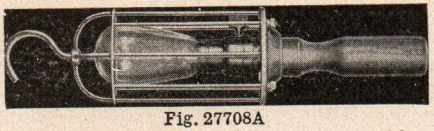


Fig. 27708A

A strong and convenient portable, made of Bessemer steel, copper-plated. Takes any ⅜-inch standard brass socket, but is furnished without socket.

No.	To Fit Lamp Watts	Style Socket	Price Each
4645	40	Keyless	**2.50**
4676	60	"	**2.50**

BULLDOG

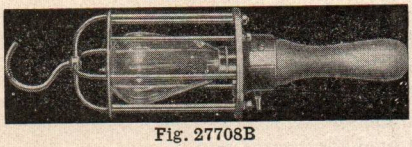


Fig. 27708B

Furnished with key or keyless socket, securely imbedded in handle, giving a firm, rigid base.

4675	60	Key	**3.50**
2590	60	Keyless	**3.50**

DREADNAUGHT

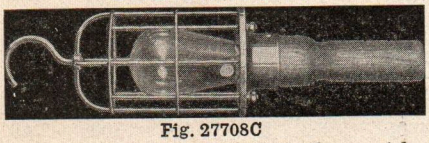


Fig. 27708C

Made of Bessemer steel, built to withstand hard usage. Has porcelain keyless socket fitted with spring contact firmly embedded in handle. Metal part copper-plated finish.

4000	60	Keyless	**3.50**

NATIONAL

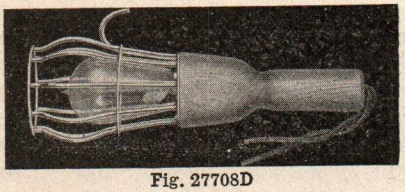


Fig. 27708D

Solid one-piece portable. Convenient open end allows easy lamp change. Made of steel heavily tinned, has porcelain keyless socket.

1451	40	Weatherproof	**2.50**
1452	60	"	**2.50**

SAFETY VAPOR-PROOF

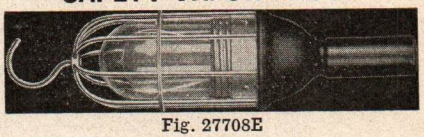


Fig. 27708E

For garage or wherever gases or inflammable materials may be used. Has heavy steel frame, strong handle, handy grip hook and vapor-proof receptacle. Heavy tinned finish.

No.	To Fit Lamp Watts	Style Socket	Price Each
3001	25	Vapor-proof	**5.00**

CABLE RACK

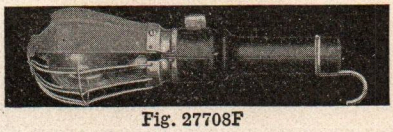


Fig. 27708F

Portable with black enamel handle. Cage portion is half guard and half reflector. Handle equipped with hook.

Furnished with key or keyless socket securely embedded in handle giving a firm and rigid base. Takes a 60-watt, 110-volt Mazda lamp.

2000	60	Key	**2.80**
2001	60	Keyless	**2.80**

MONITOR

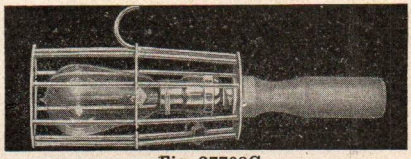


Fig. 27708G

A low priced guard furnished without socket.

1453	40	.....	**1.70**
1454	60	.....	**1.80**

CRESCENT TUBULAR

Fig. 27708H

For use behind switchboard, examining boilers, among machine parts, for garages, and places where space is limited. Extreme diameter, only 2 inches. Length with hook, 13 inches.

2958	25	Keyless	**3.50**

NOARK ENCLOSED FUSES

NATIONAL ELECTRICAL CODE STANDARD

TYPE B

FERRULE CONTACT SPRING CLIP STYLE

Fig. 14803A

These fuses are designed on scientific lines and they never fail to blow at the proper time and under the exact conditions claimed, thus affording absolute protection at all times.

They have a definite and accurate time interval of operation, varying from a few seconds on heavy overloads to the infinitesimal parts of a second on a dead short circuit.

The materials used in the construction of these fuses are of the latest design and conform strictly to the rulings and recommendations of the Underwriters' Laboratories after examination under the provisions of the National Electrical Code.

250 VOLTS, 0-60 AMPERES

No.	Amps.	Length In.	Carton Quantity	Std. Pkg.	Price Each
2600	1	2	10	100	.25
2601	2	2	10	100	.25
2602	3	2	10	100	.25
2603	4	2	10	100	.25
2604	5	2	10	100	.25
2605	6	2	10	100	.25
2606	7	2	10	100	.25
2607	8	2	10	100	.25
2608	9	2	10	100	.25
2609	10	2	10	100	.25
2610	12	2	10	100	.25
2611	15	2	10	100	.25
2612	20	2	10	100	.25
2613	25	2	10	100	.25
2614	30	2	10	100	.25
2615	35	3	10	100	.35
2616	40	3	10	100	.35
2617	45	3	10	100	.35
2618	50	3	10	100	.35
2619	55	3	10	100	.35
2620	60	3	10	100	.35

600 VOLTS, 0-60 AMPERES

No.	Amps.	Length In.	Carton Quantity	Std. Pkg.	Price Each
4600	1	5	10	100	.40
4601	2	5	10	100	.40
4602	3	5	10	100	.40
4603	4	5	10	100	.40
4604	5	5	10	100	.40
4605	6	5	10	100	.40
4606	7	5	10	100	.40
4607	8	5	10	100	.40
4608	9	5	10	100	.40
4609	10	5	10	100	.40
4610	12	5	10	100	.40
4611	15	5	10	100	.40
4612	20	5	10	100	.40
4613	25	5	10	100	.40
4614	30	5	10	100	.40
4615	35	5½	10	100	.60
4616	40	5½	10	100	.60
4617	45	5½	10	100	.60
4618	50	5½	10	100	.60
4619	55	5½	10	100	.60
4620	60	5½	10	100	.60

Different capacities cannot be combined to make standard package quantities.

None of the above fuses are refillable.

NOARK ENCLOSED FUSES

NATIONAL ELECTRICAL CODE STANDARD

TYPE E

SINGLE KNIFE BLADE SWITCH CONTACT STYLE

Fig. 14805A

These fuses are made on the same general style as the Noark Type B and have the same fine materials used in their construction.

250 VOLTS, 61-400 AMPERES

No.	Amps.	Length In.	Carton Qty.	Std. Pkg.	Price Each	Price Re-filling Each
2650	65	5⅞	5	50	.90	.60
2651	70	5⅞	5	50	.90	.60
2652	75	5⅞	5	50	.90	.60
2653	80	5⅞	5	50	.90	.60
2654	85	5⅞	5	50	.90	.60
2655	90	5⅞	5	50	.90	.60
2656	95	5⅞	5	50	.90	.60
2657	100	5⅞	5	50	.90	.60
2658	110	7⅛	5	25	2.00	.90
2659	125	7⅛	5	25	2.00	.90
2660	150	7⅛	5	25	2.00	.90
2661	175	7⅛	5	25	2.00	.90
2662	200	7⅛	5	25	2.00	.90
2663	225	8⅝	2	25	3.60	1.50
2664	250	8⅝	2	25	3.60	1.50
2665	275	8⅝	2	25	3.60	1.50
2666	300	8⅝	2	25	3.60	1.50
2667	325	8⅝	2	25	3.60	1.50
2668	350	8⅝	2	25	3.60	1.50
2669	375	8⅝	2	25	3.60	1.50
2670	400	8⅝	2	25	3.60	1.50

600 VOLTS, 61-400 AMPERES

No.	Amps.	Length In.	Carton Qty.	Std. Pkg.	Price Each	Price Re-filling Each
4650	65	7⅞	5	50	1.50	.80
4651	70	7⅞	5	50	1.50	.80
4652	75	7⅞	5	50	1.50	.80
4653	80	7⅞	5	50	1.50	.80
4654	85	7⅞	5	50	1.50	.80
4655	90	7⅞	5	50	1.50	.80
4656	95	7⅞	5	50	1.50	.80
4657	100	7⅞	5	50	1.50	.80
4658	110	9⅝	5	25	2.50	1.20
4659	125	9⅝	5	25	2.50	1.20
4660	150	9⅝	5	25	2.50	1.20
4661	175	9⅝	5	25	2.50	1.20
4662	200	9⅝	5	25	2.50	1.20
4663	225	11⅝	2	25	5.50	2.00
4664	250	11⅝	2	25	5.50	2.00
4665	275	11⅝	2	25	5.50	2.00
4666	300	11⅝	2	25	5.50	2.00
4667	325	11⅝	2	25	5.50	2.00
4668	350	11⅝	2	25	5.50	2.00
4669	375	11⅝	2	25	5.50	2.00
4670	400	11⅝	2	25	5.50	2.00

250 VOLTS, 401-1000 AMPERES

2671	450	10⅜	2	10	5.50	2.00
2672	500	10⅜	2	10	5.50	2.00
2673	550	10⅜	2	10	5.50	2.00
2674	600	10⅜	2	10	5.50	2.00

600 VOLTS, 401-1000 AMPERES

4671	450	13⅜	2	10	8.00	3.00
4672	500	13⅜	2	10	8.00	3.00
4673	550	13⅜	2	10	8.00	3.00
4674	600	13⅜	2	10	8.00	3.00

Different capacities cannot be combined to make standard package quantities.

EVEREADY DAYLOS

No. 2602

Fig. 26791A

No. 2624

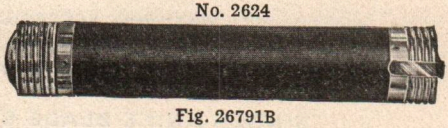


Fig. 26791B

Style of Case	Vulcanized Fiber					Cloth Covered			
Number	2602	2604	2612	2614	2615	*2622	2624	2625	2626
Size ... inches	1¼x5½	1½x6½	1½x8½	1½x11	1½x13	1½x6½	1½x6½	1½x6½	1½x8½
No. of Battery	791	790	705	711	715	790	790	790	705
" " Bulb	1182	1198	1193	1199	1195	1198	1198	1198	1193
Price, Complete	**1.35**	**1.70**	**2.00**	**2.25**	**2.50**	**1.25**	**1.25**	**1.25**	**1.50**
Extra Batteries ... each	**.30**	**.35**	**.50**	**.65**	**.85**	**.35**	**.35**	**.35**	**.50**
Extra Bulbs ... "	**.20**	**.20**	**.20**	**.20**	**.20**	**.20**	**.20**	**.20**	**.20**

*No. 2622 has a snake cloth case; No. 2625 has an alligator cloth case; Nos. 2624 and 2626 are black cloth covered.

No. 2616, MINERS'

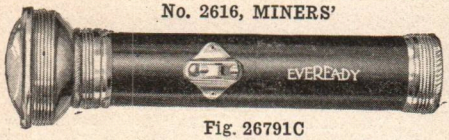


Fig. 26791C

No. 2659, SEARCHLIGHT

Fig. 26791D

Style of Case	Vulcanized Fiber					
Number	2616	2619	2621	2623	*2659	*2653
Size ... inches	1½x6½	1½x8½	1½x11	1½x13	1½x8½	1½x13
No. of Battery	790	705	711	715	705	715
" " Bulb	1198	1193	1199	1195	1193	1195
Price, Complete ... each	**2.00**	**2.25**	**2.50**	**2.75**	**3.25**	**3.85**
" Extra Batteries .. "	**.35**	**.50**	**.65**	**.85**	**.50**	**.85**
" " Bulbs .... "	**.20**	**.20**	**.20**	**.20**	**.20**	**.20**

*Equipped with lens and parabolic reflector. Throws a powerful beam for a great distance.

No. 2632

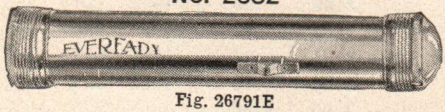


Fig. 26791E

Style of Case	Nickel-plated				
Number	2630	2631	2632	2633	2634
Size ... inches	1¼x5½	1½x6½	1½x8½	1½x8½	1½x6½
No. of Battery	791	790	705	705	790
" " Bulb	1182	1198	1193	1193	1198
Price, Complete ... each	**1.55**	**1.85**	**2.25**	**2.75**	**2.35**
" Extra Battery ... "	**.30**	**.35**	**.50**	**.50**	**.35**
" " Bulbs ... "	**.20**	**.20**	**.20**	**.20**	**.20**

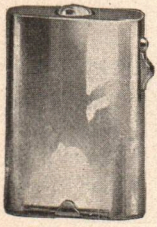


Fig. 26791F

No. 6962, HINGED BOTTOM

These cases are nickel-plated. They have combination push and slide contact, the battery being inserted at the bottom.

Number	6900	6961	6962	6954
Size ... inches	2½x1½x⅝	3x1¾x¾	3x2¼x¾	3½x1⅞x1
No. of Tungsten Battery	700	750	751	792
" " Mazda Bulb	1179	1180	1181	1182
Price, Complete ... each	**1.00**	**1.00**	**1.25**	**1.35**
" Ex. Tungsten Batteries ... each	**.30**	**.30**	**.40**	**.40**
Price, Ex. Mazda Bulbs .. "	**.20**	**.20**	**.20**	**.20**

MAZDA LAMPS

FOR STANDARD LIGHTING SERVICE

SCHEDULE I

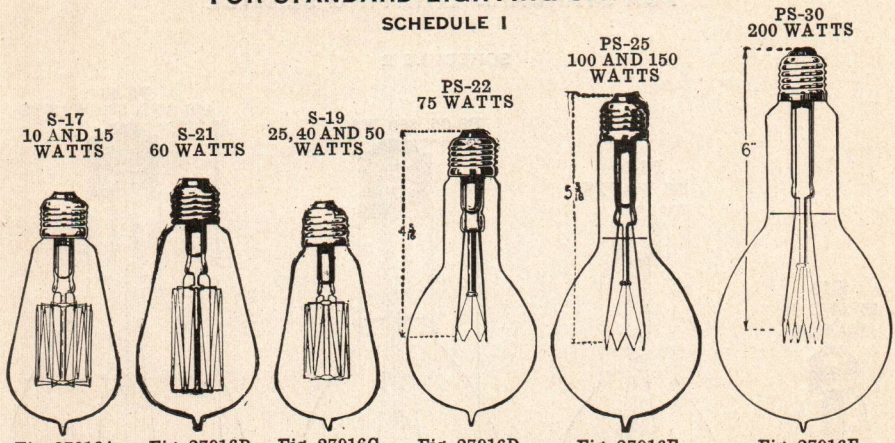


Fig. 27916A Fig. 27916B Fig. 27916C Fig. 27916D Fig. 27916E Fig. 27916F

These lamps constitute more than 75 per cent of the ordinary lamp demand for such service as residence, store and office lighting. These lamps are for use on ordinary 110 to 125-volt lighting circuits.

STRAIGHT SIDE BULB—MAZDA B LAMPS—110 TO 125 VOLTS

Rated Watts	Lumens per Watt	Watts per Spherical C. P.	Watts per Horizontal C. P.	Type Bulb	Diam. Inches	Length Inches	Base Regularly Furnished	Std. Pkg.	Price, Each Clear	Price, Each Frosted
10	7.52	1.67	1.30	S-17	2⅛	4⅞	Med. Screw	100	.35	.38
15	8.32	1.51	1.18	S-17	2⅛	4⅞	" "	100	.35	.38
25	8.91	1.41	1.10	S-19	2⅜	5¼	" "	100	.35	.38
40	9.24	1.36	1.06	S-19	2⅜	5¼	" "	100	.35	.38
50	9.45	1.33	1.04	S-19	2⅜	5¼	" "	100	.35	.38
60	9.59	1.31	1.02	S-21	2⅝	5½	" "	100	.40	.45

STRAIGHT SIDE BULB—MILL TYPE MAZDA LAMPS—110 TO 125 VOLTS

25	8.38	1.50	....	S-19	2⅜	5¼	Med. Screw	100	.45	.48
50	8.73	1.44	....	S-19	2⅜	5¼	" "	100	.45	.48

†PEAR SHAPED BULB—MAZDA C LAMPS—110 TO 125 VOLTS

75	11.53	1.09	....	PS-22	2¾	6⅛	Med. Screw	50	.70	.75
100	12.57	1.00	....	PS-25	3⅛	7⅛	" "	24	1.10	1.15
150	13.66	.92	....	PS-25	3⅛	7⅛	" "	24	1.65	1.70
200	14.61	.86	....	PS-30	3¾	8⅜	" "	24	2.20	2.27
300	16.11	.78	....	PS-35	4⅜	9¾	¶Mog. Screw	24	3.25	3.35
400	16.76	.75	....	PS-40	5	10	" "	12	4.30	4.45
500	17.45	.72	....	PS-40	5	10	" "	12	4.70	4.85
750	18.48	.68	....	PS-52	6½	13⅜	" "	8	6.50	6.75
1000	19.33	.65	....	PS-52	6½	13⅜	" "	8	7.50	7.75

Lamps of voltages of 100 to 109 and 126 to 130, inclusive, are not regularly carried in stock but may be obtained at the same list prices.

¶Mogul screw base regularly supplied, but medium screw skirted base (the lamp having maximum over-all length of 10¼ inches and light center length 7½ inches) will be supplied at same price if demanded, but attention is called to the fact that the use of MAZDA C lamps of this wattage in medium screw sockets is contrary to the Rules of the Underwriters.

†Orders should specifically state if lamps are to be burned in other than the pendent position.

Illustrations are one-fourth actual size.

MAZDA LAMPS

FOR STANDARD LIGHTING SERVICE

SCHEDULE 2

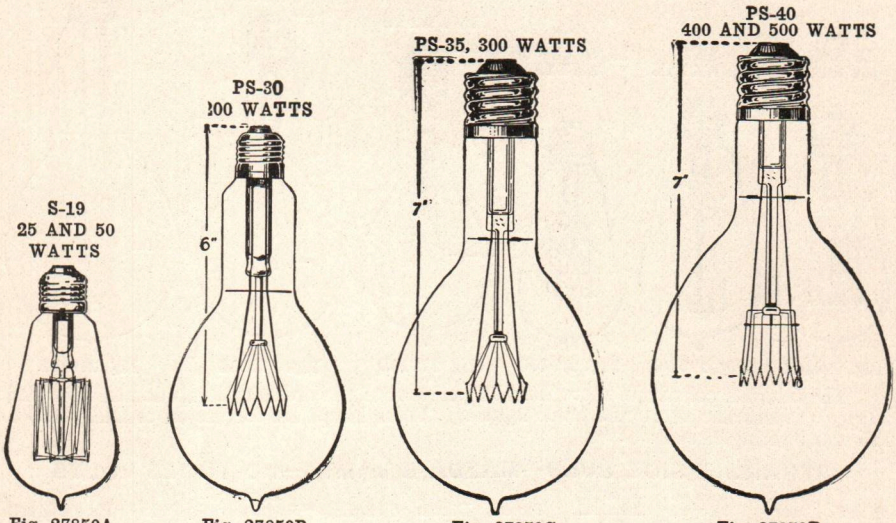


Fig. 27850A Fig. 27850B Fig. 27850C Fig. 27850D

These lamps are used on 220 to 250-volt lighting circuits. Some central station lighting companies supply power for lighting at this voltage and some manufacturing plants, having their own lighting system, also employ this voltage.

STRAIGHT SIDE BULB—MAZDA B LAMPS—220 TO 250 VOLTS

Rated Watts	Lumens. per Watts	Watts per Spherical C. F	Watts per Horizontal C. P.	Type Bulbs	Diam. Inches	Length Inches	Base Regularly Supplied	Std. Pkg.	Price, Each Clear	Price, Each Frosted
25	7.62	1.65	1.30	S-19	2 3/8	5 1/4	Med. Screw.	100	.40	.43
50	8.61	1.46	1.18	S-19	2 3/8	5 1/4	" "	100	.40	.43
100	9.45	1.33	1.10	S-30	3 3/4	7 7/8	" "	24	1.00	1.07
150	9.45	1.33	1.05	S-35	4 3/8	8 3/4	" "	24	1.50	1.60
250	10.47	1.20	.95	S-40	5	10	" "	12	2.50	2.65

*PEAR-SHAPE BULB—MAZDA C LAMPS—220 TO 250 VOLTS

200	12.57	1.00	....	PS-30	3 3/4	8 3/8	Med. Screw	24	2.40	2.47
300	13.66	.92	....	PS-35	4 3/8	9 3/4	Mog. "	24	3.90	4.00
400	14.61	.86	....	PS-40	5	10	" "	12	5.10	5.25
500	15.14	.83	....	PS-40	5	10	" "	12	5.60	5.75
750	16.76	.75	....	PS 52	6 1/2	13 3/8	" "	8	7.70	7.95
1000	17.45	.72	....	PS-52	6 1/2	13 3/8	" "	8	9.00	9.25

Prices upon application.

*Orders should specifically state if lamps are to be burned in other than the pendent position.

Illustrations are one-fourth actual size.

Lamps of voltages of 200 to 219 and 251 to 260, inclusive, are not regularly carried in stock, but may be obtained at the same prices.

MAZDA MINIATURE LAMPS

Nos. 1 AND 2

Fig. 19991A

Nos. 11 AND 12

Fig. 19991B

Nos. 16, 17, 18

Fig. 19991C

No. 31

Fig. 19991D

Nos. 32, 33, 34, 35

Fig. 19991E

MAZDA B LAMPS, MINIATURE SCREW BASE FOR FLASHLIGHT SERVICE

Bulb	No.	Description and Use	Ratings Appearing On Lamps		Price Each Clear
FE-3¾	1	Flat End Open Back Bulb for Case Type Battery.....	2.5	0.30	.20
G- 3½	11	Round Clear Bulb for Tubular Type Battery.....	2.7	0.30	.20
G- 4½	16	" " " " " " "	2.9	0.30	.20
		FOR THREE-CELL FLASHLIGHT BATTERIES			
FE-3¾	2	Flat End Opal Back Bulb for Case or Type Battery...	3.8	0.30	.20
G- 4½	17	Round Clear Bulb for Case or Tubular Type Battery..	3.8	0.30	.20
		FOR FIVE-CELL FLASHLIGHT BATTERIES			
G- 5½	31	Round Clear Bulb for Tubular Type Battery.....	6.2	0.30	.20
		FOR ONE-CELL STANDARD DRY BATTERY			
G- 4½	19	Round Clear Bulb.....	1.50	0.60	.20
	33	" " "	1.50	0.70	.20
		FOR TWO CELLS OF STANDARD DRY BATTERIES			
G- 5½	35	Round Clear Bulb.....	2.7-3	0.80	.20

Unit package quantity, 10 lamps.

Nos. 240, 242, 244, 246

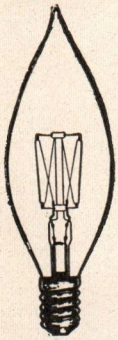


Fig. 19991F

Nos. 260, 262, 264, 266

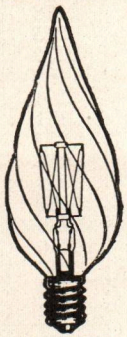


Fig. 19991G

Nos. 280, 282. 284, 286

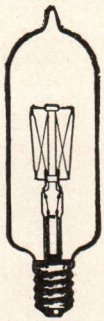


Fig. 19991H

Nos. 190, 192, 194, 196

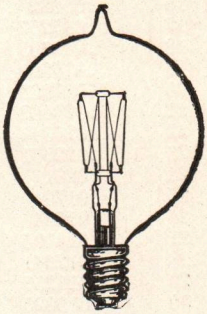


Fig. 19991J

MAZDA B LAMPS, CANDELABRA BASE

		Clear							Frosted				
		Mazda Number				Price			Mazda Number				Price
Watts	Bulb	110 V.	115 V.	120 V.	125 V.	Each	Watts	Bulb	110 V.	115 V.	120 V.	125 V.	Each
15	B- 9½	240	242	244	246	.75	15	B- 9½	241	243	245	247	.75
15	D-10	260	262	264	266	.75	15	D-10	261	263	265	267	.75
15	T- 8	280	282	284	286	.75	15	T- 8	281	283	285	287	.75
15	G-16½	190	192	194	196	.75	15	G-16½	191	193	195	197	.75

Order lamps by Mazda numbers. Unit package quantity, 5 lamps.
Illustrations are one-half actual size.

DIFFERENT STANDARDS FOR WIRE GAUGE IN USE IN THE UNITED STATES

DIMENSIONS OF SIZES IN DECIMAL PARTS OF AN INCH

Number of Wire Gauge	American or Brown & Sharpe	Birmingham or Stubs' Wire	Washburn & Moen Mfg. Co.	Imperial Wire Gauge	Stubs' Steel Wire	U. S. Standard for Plate	Number of Wire Gauge
000000	.....	....	.....	.464	....	.46875	000000
00000	.....	....	.....	.432	....	.4375	00000
0000	.46	.454	.3938	.400	....	.40625	0000
000	.40964	.425	.3625	.372	....	.375	000
00	.3648	.38	.3310	.348	....	.34375	00
0	.32486	.34	.3065	.324	....	.3125	0
1	.2893	.3	.2830	.300	.227	.28125	1
2	.25763	.284	.2625	.276	.219	.265625	2
3	.22942	.259	.2437	.252	.212	.25	3
4	.20431	.238	.2253	.232	.207	.234375	4
5	.18194	.22	.2070	.212	.204	.21875	5
6	.16202	.203	.1920	.192	.201	.203125	6
7	.14428	.18	.1770	.176	.199	.1875	7
8	.12849	.165	.1620	.160	.197	.171875	8
9	.11443	.148	.1483	.144	.194	.15625	9
10	.10189	.134	.1350	.128	.191	.140625	10
11	.090742	.12	.1205	.116	.188	.125	11
12	.080808	.109	.1055	.104	.185	.109375	12
13	.071961	.095	.0915	.092	.182	.09375	13
14	.064084	.083	.0800	.080	.180	.078125	14
15	.057068	.072	.0720	.072	.178	.0030125	15
16	.05082	.065	.0625	.064	.175	.0625	16
17	.045257	.058	.0540	.056	.172	.05625	17
18	.040303	.049	.0475	.048	.168	.05	18
19	.03589	.042	.0410	.040	.164	.04375	19
20	.031961	.035	.0348	.036	.161	.0375	20
21	.028462	.032	.03175	.032	.157	.034375	21
22	.025347	.028	.0286	.028	.155	.03125	22
23	.022571	.025	.0258	.024	.153	.028125	23
24	.0201	.022	.0230	.022	.151	.025	24
25	.0179	.02	.0204	.020	.148	.021875	25
26	.01594	.018	.0181	.018	.146	.01875	26
27	.014195	.016	.0173	.0164	.143	.0171875	27
28	.012641	.014	.0162	.0149	.139	.015625	28
29	.011257	.013	.0150	.0136	.134	.0140625	29
30	.010025	.012	.0140	.0124	.127	.0125	30
31	.008928	.01	.0132	.0116	.120	.0109375	31
32	.00795	.009	.0128	.0108	.115	.01015625	32
33	.00708	.008	.0118	.0100	.112	.009375	33
34	.006304	.007	.0104	.0092	.110	.00859375	34
35	.005614	.005	.0095	.0084	.108	.0078125	35
36	.005	.004	.0090	.0076	.106	.00703125	36
37	.004453	....	.....	.0068	.103	.006640625	37
38	.003965	....	.....	.0060	.101	.00625	38
39	.003531	....	.....	.0052	.099	.....	39
40	.003144	....	.....	.0048	.097	.....	40

USEFUL INFORMATION

Avoirdupois Weight

Drachms
16 = 1 oz. = 437.5 grains troy.
256 = 16 = 1 lb. = 1.2153 lbs. troy.
6,400 = 400 = 25 = 1 quarter.
25,600 = 1,600 = 100 = 4 = 1 cwt.
512,000 = 32,000 = 2,000 = 80 = 20 = 1 ton.

Troy Weight

Grains.
24 = 1 dwt.
480 = 20 = 1 oz.
5,760 = 240 = 12 = 1 lb. = 22.816 cubic inches of distilled water at 62°Fahr.

Dry Measure

Pints = 33.6 cubic inches.
2 = 1 quart = 67.2 cubic inches.
8 = 4 = 1 gallon = 268.8 cubic inches.
16 = 8 = 2 = 1 peck = 537.6 cubic inches.
64 = 32 = 8 = 4 = 1 bushel.

Note.—The standard U. S. bushel is the Winchester bushel, which is in cylinder form, 18½ inches in diameter and 8 inches deep, and contains 2,150.42 cubic inches.

Square Measure

Inches.
144 = 1 foot.
1,296 = 9 = 1 yard.
39,204 = 272.25 = 30.25 = 1 perch.
1,568,160 = 10,890 = 1,210 = 40 = 1 rood.
6,272,640 = 43,580 = 4,840 = 160 = 4 = 1 acre.

An acre is 69.5701 yards square; or, 208.710321 feet square.

A township is 6 miles square = 36 sections.
A section is 1 mile " = 640 acres.
¼ " is ½ " " = 160 "
$\frac{1}{16}$ " is ¼ " " = 40 "

A span is the distance that can be reached between the end of the middle finger and the end of the thumb. Among sailors 8 spans are equal to 1 thumb.

A geographic mile is $\frac{1}{21600}$ of the distance around the center of the earth.

A square mile of land is called a section.

A Gunter's chain, used by land surveyors, is 4 rods, or 66 feet long, and consists of 100 links. 7.92 inches make a link.

Canal and railroad engineers use an engineer's chain, which consists of 100 links, each 1 foot long.

Paper Measure

Quire of paper ..... 24 sheets.
Ream of paper ..... 20 quires or 480 sheets.
Bundle ..... 2 reams.
Bale ..... 5 bundles.
Roll of parchment ..... 60 skins.

Sheet of paper folded into—
2 leaves is termed folio size.
4 " " 4to or quarto.
8 " " 8vo. or octavo.
12 " " 12mo. or duodecimo.
16 " " 16mo.
18 " " 18mo
24 " " 24mo.
48 " " 48mo.

Apothecaries' Weight

Grains.
20 = 1 scruple or ℈
60 = 3 = 1 drachm or ʒ
480 = 24 = 8 = 1 oz. or ℥
5,760 = 288 = 96 = 12 = 1 lb.

Apothecaries' Measure

60 minims ..... = 1 fluid-drachm
8 fluid-drachms ..... = 1 fluid-ounce
16 fluid-ounces ..... = 1 pint
8 pints ..... = 1 gallon

Forty-five drops, or a common teaspoonful, make about 1 fluid-drachm; 2 tablespoonsful, about 1 fluid-ounce; a wineglassful, about 1½ fluid-ounces; and a teacupful, about 4 fluid-ounces.

Liquid or Wine Measure

Gills = 7.2187 cubic inches.
4 = 1 pint = 28.875 cubic inches.
8 = 2 = 1 quart = 57.75 cubic inches.
32 = 8 = 4 = 1 gallon.
2,016 = 404 = 252 = 63 = 1 hogshead.
4,032 = 1,008 = 504 = 126 = 2 = 1 pipe.
8,064 = 2,016 = 1,008 = 252 = 4 = 2 = 1 ton.

Note.—The standard unit and liquid measure adopted by the U. S. government is the Winchester wine gallon, which contains 231 cubic inches, and holds 8.339 pounds, avoirdupois, of distilled water, at its maximum density weighed in air, the barometer being at 30 inches.

The imperial gallon, adopted by Great Britain, contains 277.274 cubic inches, and equals 1.20032 U. S. gallons.

The following cylinders contain some of these measures very closely:

Gill,	diameter,	1¾	inches;	height,	3	inches.
Pint,	"	3½	"	"	3	inches.
Quart,	"	3½	"	"	6	"
Gallon	"	7	"	"	6	"
8 gallon	"	14	"	"	12	"
10 "	"	14	"	"	15	"

Weight of Water

1 cubic inch ..... = .03617 pounds.
12 cubic inches ..... = .0434 pounds.
1 cubic foot ..... = 7.48052 U. S. gallons
1 U. S. gallon ..... = 8.355 pounds
35.84 cubic feet ..... = .2240 pounds
2,240 pounds ..... = 268.8 U.S.gallons

Liquid Weight

	Lbs. Avoirdupois.
1 gallon distilled water	10
1 " sea water	10.32
1 " proof spirits	9.08

Oils

	Lbs. Avoirdupois
1 gallon sperm	7½
1 " whale	7½
1 " lard	7½
1 " tallow	7½
1 " neat's-foot	7½
1 " paraffine, 28° gravity	7⅜
1 " paraffine, 25° gravity	7½
1 " reduced Franklin	7¼
1 " castor	8
1 " kerosene	6½

METRIC AND ENGLISH OR AMERICAN (U. S.) EQUIVALENT MEASURES

MEASURES OF LENGTH

1 meter = { 39.37 inches; 3.28083 feet; 1.0936 yards }

1 centimeter = .3937 inch

1 millimeter = { .03937 inch, or; 1–25 inch nearly }

1 kilometer = 0.62137 mile

1 foot = .3048 meter

1 inch = { 2.54 centimeters; 25.4 millimeters }

MEASURES OF SURFACE

1 square meter = { 10.764 square feet; 1.196 square yards }

1 square centimeter = .155 square inch

1 square millimeter = .00155 square inch

1 square yard = .836 square meter

1 square foot = .0929 square meter

1 square inch = { 6.452 sq. centimeters; 645.2 sq. millimeters }

MEASURES OF VOLUME AND CAPACITY

1 cubic meter = { 35.314 cubic feet; 1.308 cubic yards; 264.2 gallons (231 cubic inch) }

1 cubic decimeter = { 61.023 cubic inch; .0353 cubic feet }

1 cubic centimeter = .061 cubic inch

1 liter = { 1 cubic decimeter; 61.023 cubic inches; .0353 cubic foot; 1.0567 quarts (U.S.); .2642 gallon (U.S.); 2.202 lbs. of water at 62° F. }

1 cubic yard = .7645 cubic meter

1 cubic foot = { .02832 cubic meter; 28.317 cubic decimeters; 28.317 liters }

1 cubic inch = 16.383 cubic centimeters

1 gallon (British) = 4.543 liters

1 gallon (U. S.) = 3.785 liters

MEASURES OF WEIGHT

1 gram = 15.432 grains

1 kilogram = 2.2046 pounds

1 metric ton = { .9842 ton of 2240 lbs.; 19.68 cwts.; 2204.6 lbs. }

1 grain = .0648 gram

1 ounce avoirdupois = 28.35 grams

1 pound = .4536 kilogram

1 ton of 2240 lbs. = { 1.016 metric ton; 1016 kilograms }

MISCELLANEOUS

1 kilogram per meter = .6720 pounds per foot.
1 gram per square millimeter = 1.422 pounds per square inch.
1 kilogram per square meter = 0.2084 per square foot.
1 kilogram per cubic meter = .0624 per cubic foot.
1 degree centigrade = 1.8 degrees Fahrenheit.
1 pound per foot = 1.488 kilograms per meter.
1 pound per square foot = 4.882 kilograms per square meter.
1 pound per cubic foot = 16.02 kilograms per cubic meter.
1 degree Fahrenheit = .5556 degrees centigrade.
1 Calorie (French Thermal Unit) = 3.968 B. T. U. (British Thermal Unit.)

1 horse power = { 33,000 foot pounds per minute; 746 Watts }

1 watt (unit of electrical power) = { .00134 horse power; 4424 foot pounds per minute }

1 kilowatt = { 1000 watts; 1.34 horse power; 4420 foot pounds per minute }

USEFUL INFORMATION

BELTING

In Europe cog-wheels are used to transmit power almost exclusively, but in America 99% of the power transmitted is by belting. Cog-wheel transmission is *positive*, belting is *not*, because with every revolution of a pulley a portion of the power is lost; the loss varies with the condition of the belt, change of load, state of the atmosphere, etc. The power of a belt to transmit motion is derived from the friction *hold* on the pulley; this is governed by the pressure or tension; a safe maximum working tension is about 45 lbs. per inch in width. No dogmatic rule can be laid down to determine the efficiency of a belt. After a series of numerous experiments, Josuha Rose (modern machine shop practice) states that belts vary from 25 to 100% in efficiency, for reasons given above. A long belt will transmit more power than a short one of same width and tension. Consequently long belts are always the best if it is possible to use them. A 1-inch belt traveling 800 feet per minute and with power tension will transmit 1 horse-power. If the same belt travels 1,600 feet the power will be doubled. Each additional inch to the width will add 1 horse-power, at the same speed and tension. A belt under good conditions will deliver 97% of its efficiency. If belts are too tight there will be quite a loss from friction of the journals, etc.; if too loose there will be still more loss by slipping. Excessive slipping also dries out the leather and reduces the adhesion. Within reasonable limits the greater the speed the more efficient a belt will be. About 3,750 feet per minute seems to be the maximum. A double belt will last longer than a single one, and will take double the tension, and will transmit 7/10 more power, as capacity to transmit power is governed by the frictional width of belt and its *pulling* strength. A raw-hide belt will transmit from 25 to 50% more power than a tanned one, and for straight, *non*-shifting work is much the most economical, but it is not adapted to cone pulleys or countershaft work. Belts should be used with the hair side to the pulley. If pulleys are covered with leather there will be a gain of 25% in wear of belt and in power transmitted.

It is best to have the belts run off from the main shaft in *opposite* directions to equalize the strain on the bearings. Let the diameter of the pulleys be as large as possible, within the maximum belt speed (3,750 feet per minute), and a belt should never be *overworked*, and the tension such as will give a slight sag when in motion. The per cent. of power lost by shaft journal friction should not exceed 20% of the full load; if it does it may be charged to *tight* belting. The breaking strength of good leather belting per inch in width is the *solid leather*, 675 lbs.; at *rivet holes*, 362 lbs.; at *lacing holes*, 200 lbs. It will be seen therefore, that belts would be far more durable if lacing could be done away with, as is being done in some establishments, the ends of belts being lapped and *cemented*, thus making the joints as strong as the body of belt.

TO FIND THE LENGTH OF BELT WANTED. *Rule* 1. Add the diameter of both pulleys together, divide by 2, and multiply quotient by 3.1416; add this product to twice the distance in inches between the center of shafts, and the final sum will be the length required. *Example.* Diameter of large pulley 24 in.+12 diameter of small pulley =36÷2=18×3.1416=58½+216 twice distance between shafts=274½ inches, length required.

TO FIND WIDTH OF BELT *required for a given horse-power. Rule* 2. Multiply the horse-power by the constant 2,750, then multiply the diameter of driven pulley by the number of revolutions and divide the first product by the latter, the quotient will be the width of belt required. *Example* 2. Horse-power 28×constant 2,750=77,000; diameter of pulley 36 in.×revolution 200=7,200; 77,000÷7,200=10 inches, width required.

TO FIND THE HORSE-POWER *which a belt will transmit. Rule* 3. Multiply the width of belt by diameter of driven pulley in inches, multiply this product by revolutions of pulley per minute, then divide final product by constant 2,750, the quotient will be the horse-power. *Example* 3. Belt 10in.×36 diameter of pulley=360× 200 revolutions=72,000÷2.750 constant=26.5 horse-power required.

THE HORSE-POWER AND WIDTH *of belt given, find the diameter of driven pulley required. Rule* 4. Multiply the horse-power by constant 2,750, now multiply revolutions of pulley by the width of belt, then divide the first product by the latter, the quotient will be the diameter wanted *Example* 4. Horse-power 28×2,750 =77,000; revolutions 200×10=2,000; 77,000÷2,000=38.5, diameter wanted.

USEFUL INFORMATION

RULES FOR DETERMINING SIZE AND SPEED OF PULLEYS, SHEAVES, GEARS OR SPROCKET WHEELS

The driving pulley is called the driver, and the driven pulley the driven.

If the number of teeth in gears or sprocket wheels is used instead of diameter in these calculations, number of teeth must be substituted whenever diameter occurs.

To determine diameter of driver, the diameter of the driven and its revolutions, and also revolutions of driver being given.

$$\frac{\text{Diameter of Driven} \times \text{revolutions of Driven}}{\text{Revolutions of Driver.}} = \text{Diameter of Driver.}$$

To determine the diameter of driven, the revolutions of the driven and diameter and revolutions of the driver being given.

$$\frac{\text{Diameter of Driver} \times \text{revolutions of Driver}}{\text{Revolutions of Driven.}} = \text{Diameter of Driven.}$$

To determine the revolutions of the driver, the diameter and revolutions of the driven, and diameter of the driver being given.

$$\frac{\text{Diameter of Driven} \times \text{revolutions of Driven}}{\text{Diameter of Driver.}} = \text{Revolutions of Driver.}$$

To determine the revolutions of the driven, the diameter and revolutions of the driver, and diameter of the driven being given.

$$\frac{\text{Diameter of Driver} \times \text{revolutions of Driver}}{\text{Diameter of Driven.}} = \text{Revolutions of Driven.}$$

HORSE POWER OF CAST IRON PULLEYS

Let D = diameter of pulley in inches.
W = width of belt in inches.
N = revolutions per minute.
H. P. = horse power.

$$\text{Then H. P.} = \frac{D \times W \times N}{2860} \quad \text{for single belt.}$$

$$\text{H. P.} = \frac{D \times W \times N}{1720} \quad \text{for double belt.}$$

USEFUL INFORMATION

PLAIN RULES ON GEARING

DIAMETER, when applied to gears, is always understood to mean the pitch diameter.

DIAMETRAL PITCH is the number of teeth to each inch of the pitch diameter.

EXAMPLE. If a gear has 40 teeth and the pitch diameter is 4 inches, there are 10 teeth to each inch of the pitch diameter and the diametral pitch is 10, or, in other words, the gear is 10 diametral pitch.

DIAMETRAL PITCH required, circular pitch given. Divide 3.1416 by the circular pitch.

EXAMPLE. If the circular pitch is 2 inches, divide 3.1416 by 2 and the quotient 1.5708, is the diametral pitch.

DIAMETRAL PITCH required, number of teeth and outside diameter given. Add 2 to the number of teeth and divide by the outside diameter.

EXAMPLE. If the number of teeth is 40, the diameter of the blank is 10½ inches; add 2 to the number of teeth, making 42, and divide by 10½; the quotient, 4, is the diametral pitch.

CIRCULAR PITCH is the distance from the center of one tooth to the center of the next, measured along the pitch line.

EXAMPLE. If the distance from the center of one tooth to the center of next tooth, measured along the pitch circle, is ½ inch, the gear is ½ inch circular pitch.

CIRCULAR PITCH required, diametral pitch given. Divide 3.1416 by the diametral pitch.

EXAMPLE. If the diametral pitch is 4, divide 3.1416 by 4, and the quotient, .7854, is the circular pitch.

NUMBER OF TEETH required, pitch diameter and diametral pitch given. Multiply the pitch diameter by the diametral pitch.

EXAMPLE. If the diameter of the pitch circle is 10 inches and the diametral pitch is 4, multiply 10 by 4 and the product, 40, will be the number of teeth in the gear.

NUMBER OF TEETH required, outside diameter and diametral pitch given. Multiply the outside diameter by the diametral pitch and subtract 2.

EXAMPLE. If the whole diameter is 10½ and the diametral pitch is 4, multiply 10½ by 4, and the product, 42 less 2, or 40, is the number of teeth.

PITCH DIAMETER required, number of teeth and diametral pitch given. Divide the number of teeth by the diametral pitch.

EXAMPLE. If the number of teeth is 40 and the diametral pitch is 4, divide 40 by 4 and the quotient, 10, is the pitch diameter.

OUTSIDE DIAMETER or size of gear blank required, number of teeth and diametral pitch given. Add 2 to the number of teeth and divide by the diametral pitch.

EXAMPLE. If the number of teeth is 40 and the diametral pitch is 4, add 2 to the 40, making 42, and divide by 4; the quotient, 10½, is the whole diameter of the gear or blank.

THICKNESS OF TOOTH AT PITCH LINE required. Divide the circular pitch by 2, or 1.57 by the diametral pitch.

EXAMPLE. If the circular pitch is 1.047 inch, or the diametral pitch is 3, divide 1.047 by 2, or 1.57 by 3, and the quotient, .523 inch, is the thickness of tooth.

WHOLE DEPTH OF TOOTH required. Divide 2.157 by the diametral pitch.

EXAMPLE. If the diametral pitch of a gear is 6, the whole depth is 2.157 divided by 6, which equals .3595.

WHOLE DEPTH OF TOOTH is about $\frac{11}{16}$ or exactly .6866 of the circular pitch.

EXAMPLE. If the circular pitch is 2, the whole depth of tooth is about $\frac{11}{16}$ of 2 inches or 1⅜ inches nearly.

DISTANCE BETWEEN CENTERS of two gears required. Add the number of teeth together and divide one-half the sum by the diametral pitch.

EXAMPLE. If the two gears have 50 and 30 teeth, respectively, and are 5 pitch, add 50 and 30, making 80, divide by 2 and then divide the quotient, 40, by the diametral pitch, 5, and the result, 8 inches, is the center distance.

USEFUL INFORMATION

SIZES OF NUMBERS OF THE U. S. STANDARD GAUGE

FOR SHEET AND PLATE IRON AND STEEL

Number of Gauge	Approximate Thickness in Fractions of an Inch	Approximate Thickness in Decimal Parts of an Inch	Weight per Square Foot in Ounces Avoirdupois	Weight per Square Foot in Pounds Avoirdupois
0000000	1–2	.5	320	20.00
000000	15–32	.46875	300	18.75
00000	7–16	.4375	280	17.50
0000	13–32	.40625	260	16.25
000	3–8	.375	240	15.00
00	11–32	.34375	220	13.75
0	5–16	.3125	200	12.50
1	9–32	.28125	180	11.25
2	17–64	.265625	170	10.625
3	1–4	.25	160	10.00
4	15–64	.234375	150	9.375
5	7–32	.21875	140	8.75
6	13–64	.203125	130	8.125
7	3–16	.1875	120	7.5
8	11–64	.171875	110	6.875
9	5–32	.15625	100	6.25
10	9–64	.140625	90	5.625
11	1–8	.125	80	5.00
12	7–64	.109375	70	4.375
13	3–32	.09375	60	3.75
14	5–64	.078125	50	3.125
15	9–128	.0703125	45	2.8125
16	1–16	.0625	40	2.5
17	9–160	.05625	36	2.25
18	1–20	.05	32	2.
19	7–160	.04375	28	1.75
20	3–80	.0375	24	1.50
21	11–320	.034375	22	1.375
22	1–32	.03125	20	1.25
23	9–320	.028125	18	1.25
24	1–40	.025	16	1.
25	7–320	.021875	14	.875
26	3–160	.01875	12	.75
27	11–640	.0171875	11	.6875
28	1–64	.015625	10	.625
29	9–640	.0140625	9	.5625
30	1–80	.0125	8	.5
31	7–640	0109375	7	.4375
32	13–1280	.01015625	6 1–2	.40625
33	3–320	.009375	6	.375
34	11–1280	.00859375	5 1–2	.34375
35	5–640	.0078125	5	.3125
36	9–1280	.00703125	4 1–2	.28125
37	17–2560	.006640625	4 1–4	.265625
38	1–160	.00625	4	.25

STANDARD GAUGES

Number of Gauge	Thickness in Decimals of an Inch					
	Birmingham or Stubb's Iron Wire	Brown and Sharpe	British Imperial or New British	United States	Stubb's Steel Wire	Diam. of American Steel & Wire Co.'s Gauge
0000	.454	.46000	.400	.40625	....	.3938
000	.425	.40964	.372	.37500	....	.3625
00	.380	.36480	.348	.34375	....	.3310
0	.340	.32486	.324	.31250	....	.3065
1	.300	.28930	.300	.28125	.227	.2830
2	.284	.25763	.276	.26562	.219	.2625
3	.259	.22942	.252	.25000	.212	.2437
4	.238	.20431	.232	.23437	.207	.2253
5	.220	.18194	.212	.21875	.204	.2070
6	.203	.16202	.192	.20312	.201	.1920
7	.180	.14428	.176	.18750	.199	.1770
8	.165	.12849	.160	.17187	.197	.1620
9	.148	.11443	.144	.15625	.194	.1483
10	.134	.10189	.128	.14062	.191	.1350
11	.120	.09074	.116	.12500	.188	.1205
12	.109	.08081	.104	.10937	.185	.1055
13	.095	.07196	.092	.09375	.182	.0915
14	.083	.06408	.080	.07812	.180	.0800
15	.072	.05707	.072	.07031	.178	.0720
16	.065	.05082	.064	.06250	.175	.0625
17	.058	.04526	.056	.05625	.172	.0540
18	.049	.04030	.048	.05000	.168	.0475
19	.042	.03589	.040	.04375	.164	.0410
20	.035	.03196	.036	.03750	.161	.0348
21	.032	.02846	.032	.03437	.157	.0317
22	.028	.02535	.028	.03125	.155	.0286
23	.025	.02257	.024	.02812	.153	.0258
24	.022	.02010	.022	.02500	.151	.0230
25	.020	.01790	.020	.02187	.148	.0204
26	.018	.01594	.018	.01875	.146	.0181

USEFUL INFORMATION

WEIGHT OF IRON AND STEEL SHEETS

WEIGHTS PER SQUARE FOOT
TAKEN FROM KENT'S MECHANICAL ENGINEERS' POCKETBOOK

Thickness by Birmingham Gauge				Thickness by American (Brown & Sharpe's) Gauge			
Number of Gauge	Thickness in Inches	Iron	Steel	Number of Gauge	Thickness in Inches	Iron	Steel
0000	.454	18.16	18.52	0000	.46	18.40	18.77
000	.425	17.00	17.34	000	.4096	16.38	16.71
00	.38	15.20	15.50	00	.3648	14.59	14.88
0	.34	13.60	13.87	0	.3249	13.00	13.26
1	.3	12.00	12.24	1	.2893	11.57	11.80
2	.284	11.36	11.59	2	.2576	10.30	10.51
3	.259	10.36	10.57	3	.2294	9.19	9.36
4	.238	9.52	9.71	4	.2043	8.17	8.34
5	.22	8.80	8.98	5	.1819	7.28	7.42
6	.203	8.12	8.28	6	.1620	6.48	6.61
7	.18	7.20	7.34	7	.1443	5.77	5.89
8	.165	6.60	6.73	8	.1285	5.14	5.24
9	.148	5.92	6.04	9	.1144	4.58	4.67
10	.134	5.36	5.47	10	.1019	4.08	4.16
11	.12	4.80	4.90	11	.0907	3.63	3.70
12	.109	4.36	4.45	12	.0808	3.23	3.30
13	.095	3.80	3.88	13	.0720	2.88	2.94
14	.083	3.32	3.39	14	.0641	2.56	2.62
15	.072	2.88	2.94	15	.0571	2.28	2.33
16	.065	2.60	2.65	16	.0508	2.03	2.07
17	.058	2.32	2.37	17	.0453	1.81	1.85
18	.049	1.96	2.00	18	.0403	1.61	1.64
19	.042	1.68	1.71	19	.0359	1.44	1.46
20	.035	1.40	1.43	20	.0320	1.28	1.31
21	.032	1.28	1.31	21	.0285	1.14	1.16
22	.028	1.12	1.14	22	.0253	1.01	1.03
23	.025	1.00	1.02	23	.0226	.904	.922
24	.022	.88	.898	24	.0201	.804	.820
25	.02	.80	.816	25	.0179	.716	.730
26	.018	.72	.734	26	.0159	.636	.649
27	016	.64	.653	27	.0142	.568	.579
28	.014	.56	.571	28	.0126	.504	.514
29	.013	.52	.530	29	.0113	.452	.461
30	.012	.48	.490	30	.0100	.400	.408
31	.01	.40	.408	31	.0089	.356	.363
32	.009	.36	.367	32	.0080	.320	.326
33	.008	.32	.326	33	.0071	.284	.290
34	.007	.28	.286	34	.0063	.252	.257
35	.005	.20	.204	35	.0056	.224	.228

	Iron	Steel
Specific Gravity	7.7	7.854
Weight per Cubic Foot	480.	489.6
" " " Inch	.2778	.2833

As there are many gauges in use differing from each other, and even the thicknesses of a certain specified gauge, as the Birmingham, are not assumed the same by all manufacturers, orders for sheets and wires should always state the weight per square foot, or the thickness in thousandths of an inch.

USEFUL INFORMATION

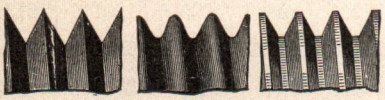
STANDARD THREADS FOR BOLTS AND PIPE

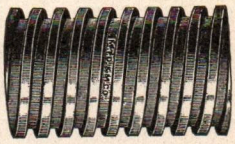
U. S. S. Bolt Threads					Pipe Threads		
Diameter Inches	Threads per Inch	Short Diameter of Nut Inches	Diameter of Hole in Nut, Inches		Diameter Inches	Threads per Inch	Diameter of Drill Inches
			Decimals	Fractions			
1/4	20	1/2	.185	3/16	1/8	27	21/64
5/16	18	19/32	.240	1/4	1/4	18	27/64
3/8	16	11/16	.294	19/64	3/8	18	9/16
7/16	14	25/32	.344	11/32	1/2	14	23/32
1/2	13	7/8	.400	13/32	3/4	14	15/16
9/16	12	31/32	.454	29/64	1	11 1/2	1 3/16
5/8	11	1 1/16	.507	33/64	1 1/4	11 1/2	1 15/32
3/4	10	1 1/4	.620	5/8	1 1/2	11 1/2	1 23/32
7/8	9	1 7/16	.731	47/64	2	11 1/2	2 3/16
1	8	1 5/8	.837	27/32	2 1/2	8	2 11/16
1 1/8	7	1 13/16	.940	15/16	3	8	3 5/16
1 1/4	7	2	1.065	1 1/16	3 1/2	8	3 13/16
1 3/8	6	2 3/16	1.160	1 5/32	4	8	4 5/16
1 1/2	6	2 3/8	1.284	1 9/32	4 1/2	8	4 13/16
1 5/8	5 1/2	2 9/16	1.389	1 13/32	5	8	5 5/16
1 3/4	5	2 3/4	1.490	1 1/2	6	8	6 3/8
1 7/8	5	2 15/16	1.615	1 5/8	7	8	7 3/8
2	4 1/2	3 1/8	1.712	1 23/32	8	8	8 3/8
2 1/4	4 1/2	3 1/2	1.962	1 15/32	9	8	9 3/8
2 1/2	4	3 7/8	2.175	2 11/64	10	8	10 9/16
2 3/4	4	4 1/4	2.425	2 27/64	11	8	11 9/16
3	3 1/2	4 5/8	2.628	2 41/64	12	8	12 9/16
3 1/4	3 1/2	5	2.878	2 7/8			
3 1/2	3 1/4	5 3/8	3.100	3 7/64			
3 3/4	3	5 3/4	3.317	3 5/16			
4	3	6 1/8	3.566	3 9/16			

Standard taper of pipe threads is 1-inch in 16, or 3/4-inch to foot.

STANDARD THREADS

V-THREAD WHITWORTH U. S. STANDARD 29° THREAD ACME STANDARD





The U. S. S. thread has flat sides, at an angle of 60 degrees to each other, with flat top and bottom, equal to one-eighth of the pitch.

TABLE OF THREAD PARTS—ACME STANDARD

Threads per Inch Linear	Depth of Thread	Thickness at Top of Thread	Space at Bottom of Thread	Space at Top of Thread	Thickness at Root of Thread	Threads per Inch Linear	Depth of Thread	Thickness at Top of Thread	Space at Bottom of Thread	Space at Top of Thread	Thickness at Root of Thread
1	.5100	.3707	.3655	.6293	.6345	6	.0933	.0618	.0566	.1049	.1101
1⅓	.3850	.2880	.2728	.4720	.4772	7	.0814	.0529	.0478	.0899	.0951
2	.2600	.1853	.1801	.3147	.3199	8	.0725	.0463	.0411	.0787	.0839
3	.1767	.1235	.1183	.2098	.2150	9	.0655	.0413	.0361	.0699	.0751
4	.1350	.0927	.0875	.1573	.1625	10	.0600	.0371	.0319	.0629	.0681
5	.1100	.0741	.0689	.1259	.1311	....	....	....	....	.....	.....

HORSE POWER OF STEEL SHAFTING

FOR LINE SHAFT SERVICE

Size of Shaft Inches	Revolutions per Minute									
	100	125	150	175	200	225	250	300	350	400
$1\frac{3}{16}$	2.1	2.6	3.2	3.7	4.2	4.7	5.3	6.3	7.4	8.4
$1\frac{7}{16}$	3.7	4.6	5.6	6.5	7.4	8.3	9.3	11.1	13.	14.8
$1\frac{11}{16}$	6.	7.5	9.	10.5	12.	13.5	15.	18.	21.	24.
$1\frac{15}{16}$	9.1	11.4	13.7	15.9	18.2	20.5	22.8	27.3	31.9	36.4
$2\frac{3}{16}$	13.1	16.4	19.7	22.9	26.2	29.5	32.8	39.3	45.9	52.4
$2\frac{7}{16}$	13.1	22.6	27.2	31.7	36.2	40.7	45.3	54.3	63.4	72.4
$2\frac{11}{16}$	24.3	30.4	36.5	42.5	48.6	54.7	60.8	72.9	85.1	97.2
$2\frac{15}{16}$	31.7	39.6	47.6	55.5	63.4	71.3	79.3	95.1	111.	126.8
$3\frac{3}{16}$	40.5	50.6	60.8	70.9	81.	91.1	101.3	121.5	141.8	162.
$3\frac{7}{16}$	50.8	63.5	76.2	88.9	101.6	114.3	127.	152.4	177.8	203.2
$3\frac{11}{16}$	62.7	78.4	94.1	109.7	125.4	141.1	156.8	188.1	219.5	250.8
$3\frac{15}{16}$	76.3	95.4	114.5	133.5	152.6	171.7	190.8	228.9	267.1	305.2
$4\frac{7}{16}$	109.2	136.5	163.8	191.1	218.4	245.7	273.	327.6	382.2	436.8
$4\frac{15}{16}$	150.5	188.1	225.8	263.4	301.	338.6	376.3	451.5	526.8	602.
$5\frac{7}{16}$	208.	260.	312.	364.	416.	468.	520.	624.	728.	832.
6	270.	337.5	405.	472.5	540.	607.5	675.	810.	945.	1080.
$6\frac{1}{2}$	343.3	429.1	415.	600.8	686.6	772.4	858.3	1029.9	1201.6	1373.2
7	428.8	536.	643.2	750.4	857.6	964.8	1072.	1286.4	1500.8	1715.2
8	640.	800.	960.	1120.	1280.	1440.	1600.	1920.	2240.	2560.

For head and jack shafts, supported by bearings close to the main sheave or pulley, so as to prevent transverse strain, the following formula may be used with safety:

$$M = \frac{D^3 \times R}{125}$$

D = Diameter of Shaft in inches.

R = Number of Revolutions per Minute.

M = Horse Power.

NOTES AND TABLES

TABLE OF APPROXIMATE NUMBERS FOR VARIOUS PURPOSES

Diameter of a circle × 3.1416 = circumference.

Diameter of a circle × .8862 = side of an equal square.

Diameter of a circle × .7071 = side of an inscribed square.

Square of diameter × .7854 = area of circle.

Circumference of a circle × .31831 = diameter.

Side of a square × 1.128 = diameter of equal circle.

Square root of an area × 1.12837 = diameter of equal circle.

Square of the diameter of a sphere × 3.1416 = convex surface.

Cube of the diameter of a sphere × .5236 = solidity.

Diameter of a sphere × .806 = dimensions of equal cube.

Diameter of a sphere × .6667 = length of equal cylinder.

Square inches × .00695 = square feet.

Cubic inches × .00058 = cubic feet.

Cubic feet × .03704 = cubic yards.

Cylindrical inches × .0004546 = cubic feet.

Cylindrical feet × .02909 = cubic yards.

Cubic inches × .003607 = imperial gallons.

Cubic feet × .6232 = imperial gallons.

Cylindrical inches × .002832 = imperial gallons.

Cylindrical feet × 4.895 = imperial gallons.

183.346 circular inches = 1 square foot.

2200 cylindrical inches = 1 cubic foot.

Avoirdupois pounds × .009 = cwts.

Avoirdupois pounds × .00045 = tons.

Lineal feet × .00019 = statute miles.

Lineal yards × .000568 = statute miles.

USEFUL INFORMATION

HORSE POWER OF LEATHER BELTING

For Double Belts H. P. $= \frac{SXW}{550}$

For Single Belts H. P. $= \frac{SXW}{800}$

Where { H. P. = Horse Power.
S = Speed in feet per minute.
W = Width of Belt in inches.

HORSE POWER TRANSMITTED BY LEATHER BELTS
DRIVING POWER OF SINGLE BELTS

Speed in Feet per Minute	Width of Belt, Inches								
	2	3	4	5	6	8	10	12	14
400	1	1½	2	2½	3	4	5	6	7
600	1½	2¼	3	3¾	4½	6	7½	9	10½
800	2	3	4	5	6	8	10	12	14
1000	2½	3¾	5	6¼	7½	10	12½	15	17½
1200	3	4½	7	7½	9	12	15	18	21
1500	3¾	5¾	7½	9½	11½	15	18¾	22½	26½
1800	4½	6¾	9	11¼	13½	18	22½	27	31½
2000	5	7½	10	12½	15	20	25	30	35
2400	6	9	12	15	18	24	30	36	42
2800	7	10½	14	17½	21	28	35	42	49
3000	7½	11¼	15	18¾	22½	30	37½	45	52½
3500	8¾	13	17½	22	26	35	44	52½	61
4000	10	15	20	25	30	40	50	60	70
4500	11¼	17	22½	28	34	45	57	69	78
5000	12½	19	25	31	37½	50	62½	75	87

DRIVING POWER OF DOUBLE BELTS

Speed in Feet per Minute	Width of Belt, Inches								
	6	8	10	12	14	16	18	20	24
400	4¼	5¾	7¼	8½	10	11½	13	14½	17½
600	6½	8¾	11	13	15	17½	19½	22	26
800	8½	11½	14½	17½	20½	23	26	29	34½
1000	11	14½	18¼	21½	25½	29	32½	36	43½
1200	13	17½	22	26	30½	34½	39	44	52½
1500	16¼	21¾	27¼	32½	38	43½	49	54½	65½
1800	19½	26	32¾	39	45½	52	59	65½	78½
2000	21¾	29	36½	43½	50½	58	65½	72½	87
2400	26	34¾	44	52½	60½	69½	78½	88	105
2800	30½	40½	51	61	71	81	91½	102	122
3000	32½	43½	54½	65½	76	87½	98	108	131
3500	38	5 ¾	63½	76	89	101	114	127	153
4000	43½	58¼	72¾	87	101	116	131	145	174
4500	49	65	82	98	114	131	147	163	196
5000	54½	72¾	91	109	127	145	163	182	218

USEFUL INFORMATION

TABLE OF AREAS OF CIRCLES

Diameter	Area	Diameter	Area	Diameter	Area	Diameter	Area
1/8	.012	7 3/4	47.17	18 1/2	268.80	37 1/2	1104.5
1/4	.049	8	50.26	19	283.52	38	1134.1
3/8	.110	8 1/4	53.45	19 1/2	298.64	38 1/2	1164.2
1/2	.196	8 1/2	56.74	20	314.16	39	1194.6
5/8	.307	8 3/4	60.13	20 1/2	330.06	39 1/2	1225.4
3/4	.442	9	63 61	21	346.36	40	1256.6
7/8	.601	9 1/4	67.20	21 1/2	363.05	40 1/2	1288.3
1	.785	9 1/2	70.88	22	380.13	41	1320.3
1 1/8	.994	9 3/4	74.66	22 1/2	397.60	41 1/2	1352.7
1 1/4	1.227	10	78.54	23	415.47	42	1385.4
1 3/8	1.484	10 1/4	82.51	23 1/2	433.73	42 1/2	1418.6
1 1/2	1.767	10 1/2	86.59	24	452.39	43	1452.2
1 5/8	2.073	10 3/4	90.76	24 1/2	471.43	43 1/2	1486.2
1 3/4	2.405	11	95.03	25	490.87	44	1520.5
1 7/8	2.761	11 1/4	99.40	25 1/2	510.70	44 1/2	1555.3
2	3.14	11 1/2	103.86	26	530.93	45	1590.4
2 1/4	3.97	11 3/4	108.43	26 1/2	551.54	45 1/2	1626.0
2 1/2	4.90	12	113.09	27	572.55	46	1661.9
2 3/4	5.93	12 1/4	117.85	27 1/2	593.95	46 1/2	1698.2
3	7.06	12 1/2	122.71	28	615.75	47	1734.9
3 1/4	8.29	12 3/4	127.67	28 1/2	637.94	47 1/2	1772.1
3 1/2	9.62	13	132.73	29	660.52	48	1809.6
3 3/4	11.04	13 1/4	137.88	29 1/2	683.49	48 1/2	1847.5
4	12.56	13 1/2	143.13	30	706.86	49	1885.7
4 1/4	14.18	13 3/4	148.48	30 1/2	730.61	49 1/2	1924.4
4 1/2	15.90	14	153.93	31	754.76	50	1963.5
4 3/4	17.72	14 1/4	159.48	31 1/2	779.31	50 1/2	2003.0
5	19.63	14 1/2	165.13	32	804.25	51	2042.8
5 1/4	21.64	14 3/4	170.87	32 1/2	829.57	51 1/2	2083.1
5 1/2	23.75	15	176.71	33	855.30	52	2123.7
5 3/4	25.96	15 1/4	182.65	33 1/2	881.41	52 1/2	2164.8
6	28.27	15 1/2	188.69	34	907.92	53	2206.2
6 1/4	30.67	15 3/4	194.82	34 1/2	934 82	53 1/2	2248.0
6 1/2	33.18	16	201.06	35	962.11	54	2290.2
6 3/4	35.78	16 1/2	213.82	35 1/2	989.80	54 1/2	2332.8
7	38.43	17	226.98	36	1017.88	55	2375.8
7 1/4	41.28	17 1/2	240.52	36 1/2	1046.4	55 1/2	2419.2
7 1/2	44.17	18	254.46	37	1075.2	56	2463.0

CONVENIENT MULTIPLES

For the circumference of a circle, multiply diameter by 3.1416.
For the diameter of a circle, multiply the circumference by .31831.
For the area of a circle, multiply square of diameter by .7854.
For the surface of a sphere, multiply square of diameter by 3.1416.
For the solidity of a sphere, multiply cube of diameter by .5236.

USEFUL INFORMATION

DIFFERENT COLORS OF IRON, CAUSED BY HEAT (POUILLETT)

Deg. Cen.	Deg. Fahr.	
261 370	502 680	Violet, purple, and dull blue, between 261° C. to 370° C. It passes to bright blue, sea green, and then disappears.
500	932	Commences to be covered with a light coating of oxide; becomes a deal more impressible to the hammer and can be twisted with ease.
525	977	Becomes nascent red or just glowing in the dark.
700	1292	Sombre or dark red.
800	1472	Nascent cherry.
900	1657	Cherry red.
1000	1832	Bright cherry red.
1100	2012	Dull orange.
1200	2192	Bright orange.
1300	2372	White.
1400	2552	Brilliant white welding heat.
1500 1600	2732 2912	Dazzling white.

Light iron indicates impurity.

The heaviest steel contains least carbon.

Expanding and Contracting of Iron: All cast iron expands at the moment of becoming solid, and contracts in cooling; gray iron expands more and contracts less than other iron.

TEMPERING STEEL

Color.	Purpose.	Tem. Fahr.	Alloys whose fusing point is same temperature.
Light straw	Turning tools for metal	430	1 tin to 1¾ lead
Dark straw	Wood tools, taps and dies	470	1 tin " 2½ lead
Brown yellow	Hatchets, chipping chisels	500	1 tin " 4¾ lead
Dark purple	Springs, etc.	550	1 tin " 12 lead

AVERAGE TEMPERATURES UNDER DIFFERENT CONDITIONS

	Centigrade Degrees	Fahrenheit Degrees
BESSEMER PROCESS		
Running the slag	1580	2876
Running steel into ladle	1640	2984
Running steel into mold	1580	2876
Annealing furnace, ingot in	1200	2192
Ingot under hammer	1080	1976
OPEN HEARTH PROCESS		
Gas from producers	720	1238
Gas entering generator	400	752
Gas leaving generator	1200	2192
Air leaving generator	1000	1832
Fumes passing to shaft	300	572
End of fusion of charge	1420	2588
Refining the steel	1500	2732
Running into ladle, first	1580	2876
Running into ladle, last	1490	2714
BLAST FURNACE — GRAY BESSEMER		
Front of tuyere	1930	3506
At tapping	1570	2858

STRENGTH OF IRON

The mean strength of American wrought iron is 45,900 lbs.; English 43,900. Ultimate extension of iron is 600th part of its length. The working strain is from 1-6 to ¼ the mean strength.

Resistance to flexure actions evenly over the surface, equals ½ the tensile strength. Bars of wrought iron will expand or contract 151200th of their length for each degree of heat. With range of temperature of this country (minus 20 to plus 120°) =140°, will expand or contract 1080th part of its length, equal to the force of 20740 lbs., or 9¼ ton per sq. inch section. Tensile strength increases, in from 1 to 6 reheatings and rollings from 43904 lbs., to 60824 lbs., and in from 6 to 12, is reduced again to 43904.

SUGGESTIONS TO THE FITTER

CHIMNEYS

As a source of failure and trouble in heating plants there is nothing more responsible than defective chimneys.

A boiler will not operate without a suitable draft, and as the boiler draft depends entirely upon the chimney, the better this chimney, other conditions being equal, the more successful will be the working of the entire apparatus.

The boiler manufacturers specify in their catalogues the size of smoke pipes for the various size boilers, and it is ridiculous to assume that a chimney of lesser area will do the work.

Chimney flues for heating apparatus should be ample in size and carried as nearly straight as possible, from near the basement floor to above the highest point of roof. They should be independent flues, having no connection with other flues or openings and always the same size from bottom to top.

A well-jointed tile flue, preferably round, is better than a brick flue of larger area.

Rectangular flues, if not square, should not vary more than 4 inches in measurements.

Size of flues may be figured from following table:

Contents of Building Cubic Feet of Space	Average Direct Radiation Steam Square Feet	Tile Flues, Square or Rectangular Outside Diameter Inches	Tile Flues Round, Inside Diameter Inches	Brick Flues Inside Dimensions Inches
10000 to 20000	200 to 400	8½ x 8½	8	8 x 8
25000 " 50000	400 " 900	8½ x 13	10	8 x 12
60000 " 100000	1000 " 1600	13 x 13	12	12 x 12
100000 " 150000	1600 " 3000	18 x 18	16	16 x 16

No flues should be less than 8 inches in diameter or 8 x 8 inches square.

GUIDE FOR HOT WATER HEATING PIPES

Main	Branches
1 -inch Main will supply	2—¾-inch.
1¼ " " " "	2—1 "
1½ " " " "	2—1¼ "
2 " " " "	2—1½ "
2½ " " " "	2—1½ " and 1—1¼-inch, or 1—2 -inch and 1—1¼-inch
3 " " " "	1—2½ " " 1—2 " " 2—2 " " 1—1½ "
3½ " " " "	2—2½ " or 1—3 " and 1—2 " or 3—2 "
4 " " " "	1—3½ " and 1—2½ " or 2—3 " " 4—2 "
4½ " " " "	1—3½ " " 1—3 " " 1—4 " and 1—2½ "
5 " " " "	1—4 " " 1—3 " " 1—4½ " " 1—2½ "
6 " " " "	2—4 " " 1—3 " " 4—3 " or 10—2 "
7 " " " "	1—6 " " 1—4 " " 3—4 " and 1—2 "
8 " " " "	2—6 " " 1—5 " " 5—4 " " 2—2 "

For full details of dimensions of standard wrought pipe giving external and internal circumference, external and internal areas, etc., refer to page covering same.

SIZE OF MAIN FLOW PIPE FOR ONE-PIPE HOT WATER JOBS

Using Eureka Fittings

Size of Main.....inches	2	2½	3	3½	4	5	6	7	8
Square Feet of Radiation.	225	350	500	650	900	1500	2200	3000	4000

SUGGESTIONS TO THE FITTER

STEAM MAINS

The size of steam mains can be determined by taking the total amount of direct radiation or its equivalent, to which add for mains and branches 25 per cent, and from this total extract the square root, dividing the result by 10, which gives the size of main to use for one-pipe work. For two-pipe work, one size less is sufficient and returns can be one or two sizes less than supply.

A steam main should not decrease in size according to the area of its branches, but very much slower.

HOT WATER MAINS

No general rule can be given, as the height of expansion tank above the boiler and length of mains are constantly varying factors. The following table is suggested:

1¼-inch	Pipe	for	75	to	125	Square	Feet	Direct	Radiation
1½	" "	"	125	"	175	"	"	"	"
2	" "	"	175	"	300	"	"	"	"
2½	" "	"	300	"	475	"	"	"	"
3	" "	"	475	"	700	"	"	"	"
3½	" "	"	700	"	950	"	"	"	"
4	" "	"	950	"	1200	"	"	"	"
4½	" "	"	1200	"	1575	"	"	"	"
5	" "	"	1575	"	1975	"	"	"	"
6	" "	"	2375	"	2850	"	"	"	"

TABLE OF EXPANSION OF WROUGHT PIPE

Temperature of Air when Pipe is Filled	Increase in Inches in Length of 100 Feet of Pipe when Heated to						
Degrees Fahrenheit	180	200	215	240	265	297	338
Zero	1.44	1.60	1.72	1.92	2.12	2.31	2.70
32°	1.18	1.34	1.47	1.66	1.78	2.12	2.45
64°	.93	1.09	1.21	1.41	1.61	1.87	2.19

Under favorable conditions 1 square inch of grate surface is sufficient for 1 square foot of direct radiation in medium sized boilers, which radiation may be increased in larger heaters and reduced in smaller heaters.

One tenth to one eighth of grate surface will give area of flue. No flue should be less than 8 inches in diameter or 8x8 inches square.

1 pound of anthracite coal contains 14500 British Thermal Units.

1 heat unit (B. T. U.) raises temperature of 1 pound of water 1° and is $\frac{1}{180}$ of the distance between the freezing and the boiling points of water. 996 heat units (996 B. T. U.) will evaporate 1 pound of water at 212°.

1 square foot of grate surface will consume in a high pressure steam boiler about 12 pounds of anthracite coal per hour.

1 square foot of grate surface will consume in a low pressure steam boiler 2½ to 4 pounds of anthracite coal per hour.

1 square foot of grate surface will consume in a hot water boiler 2 to 3 pounds of anthracite coal per hour.

7½ pounds of anthracite coal will evaporate 1 cubic foot of water.

An United States gallon of water contains 231 cubic inches, weighs 8.33 pounds, and 1 cubic foot contains 7.48 gallons.

An imperial or English gallon of water contains 277.274 cubic inches, weighs 10 pounds, and 1 cubic foot contains 6.232 gallons.

A column of water exerts a pressure of .434 pounds per foot height. In practice this is usually designated as ½ pound pressure per square inch, thus allowing for ordinary friction.

USEFUL INFORMATION

WEIGHTS AND MEASURES RECOGNIZED BY THE LAWS OF THE UNITED STATES

Articles	Weight per Bushel Pounds	Articles	Weight per Bushel Pounds
Wheat	60	Buckwheat	48
Shelled Corn	56	Dried Peaches	33
Corn in Ear	70	" Apples	26
Rye	56	Onions	57
Oats	32	Salt	65
Barley	48	Stone Coal	80
Irish Potatoes	60	Malt	38
Sweet "	55	Bran	20
White Beans	60	Plastering Hair	8
Castor "	46	Turnips	55
Clover Seed	60	Unslacked Lime	30
Timothy Seed	45	Corn Meal	48
Flax Seed	56	Fine Salt	55
Hemp Seed	44	Hungarian Grass Seed	50
Peas	60	Blue Grass Seed	44

SPEED OF ELEVATOR BELTS

We give below about the correct speed elevator belts should run over a given size pulley in order to get a free and perfect discharge.

Speed of Belt—200 to 250 feet per minute over ..... 24-inch pulley
" " " 300 " 350 " " " " ..... 36 " "
" " " 400 " 450 " " " " ..... 48 " "
" " " 500 " 550 " " " " ..... 60 " "
" " " 600 " 650 " " " " ..... 72 " "

STEAM AND POWER PUMPS

GENERAL REMARKS

All pump parts made to gauge and therefore interchangeable.

All fittings such as wrenches, drain valves, etc., are boxed and securely attached to the pump, no extra charge being made for preparing the pumps for shipment.

Packing for stuffing boxes, foundation bolts and nuts, throttle valves, governors, gauges, etc., are not furnished unless at an extra cost.

Regular construction of all Piston Pattern, and Plunger and Ring Pattern Pumps (except Underwriter Fire Pumps) includes steel piston rods and iron piston rod stuffing boxes.

The pumps will be brass fitted when so ordered at a slight additional cost.

No air chambers are furnished with the smaller sizes of pumps, as the work to which the pumps are usually put is such that an air chamber is of no benefit whatever.

No air chambers furnished with Piston Pattern and Center Packed Plunger Pumps up to and including size 8x5x12 or with Duplex Power pumps up to and including size 7x10 Piston Pattern.

Copper air chambers will be furnished, if desired, at an extra cost.

PISTON TRAVEL OF DIRECT ACTING STEAM PUMPS

Although it has been in the past quite customary in rating the capacity of pumps to make the basis of the capacity a piston travel of 100 feet per minute, yet it is very evident that for short stroke pumps, by which we refer particularly to pumps of 10 inches and shorter stroke, this rating gives a speed so great that the pumps would not be durable in everyday service.

The following list, showing the number of strokes required to attain 100 feet piston speed, will, we believe, make the point clear:

Stroke of Pump.....inches	3	4	5	6	7	10
Strokes required..per minute	400	300	240	200	172	120

The capacity of a pump having voluntary valves, *i. e.*, the amount of water which it will deliver, is limited by the number of times the valves may open and close safely and without slamming, instead of being limited by the piston travel in feet per minute.

Therefore, it is evident that for pumps of 7 inches and shorter stroke, the number of strokes given above are so great that the pumps would not be durable, showing that 100 feet as a basis for capacity of all lengths of stroke is not a fair basis for comparison.

The following table shows the number of strokes required to attain a piston travel of from 50 to 125 feet per minute for pumps having strokes from 3 to 18 inches:

Piston Travel in Feet per Minute	Length of Stroke in Inches									
	3	4	5	6	7	8	10	12	15	18
	Number of Strokes per Minute									
50	200	150	120	100	86	75.	60	50	40	33
55	220	165	132	110	94	82.5	66	55	44	37
60	240	180	144	120	103	90.	72	60	48	40
65	260	195	156	130	111	97.5	78	65	52	43
70	280	210	168	140	120	105.	84	70	56	47
75	300	225	180	150	128	112.5	90	75	60	50
80	320	240	192	160	137	120.	96	80	64	53
85	340	255	204	170	146	127.5	102	85	68	57
90	360	270	216	180	154	135.	108	90	72	60
95	380	285	228	190	163	142.5	114	95	76	63
100	400	300	240	200	171	150.	120	100	80	67
105	420	315	252	210	180	157.5	126	105	84	70
110	440	330	264	220	188	165.	132	110	88	73
115	460	345	276	230	197	172.5	138	115	92	77
120	480	360	288	240	206	180.	144	120	96	80
125	500	375	300	250	214	187.5	150	125	100	83

NOTE.—To find the number of plunger displacements in a duplex pump, multiply the number of strokes as given above by 2.

USEFUL INFORMATION

FRICTION OF WATER IN PIPES

Friction loss in pounds pressure per square inch for each 100 feet of length in different size clean iron pipe, discharging given quantities of water per minute.

G. A. ELLIS, C. E.

Gal. per Min.	SIZE OF PIPE—INSIDE DIAMETER, INCHES											
	¾	1	1¼	1½	2	2½	3	4	6	8	10	12
5	3.3	0.84	0.31	0.12	.....	.....	.....	.....	.....	.....	.....	.....
10	13.0	3.16	1.05	0.47	0.12	.....	.....	.....	.....	.....	.....	.....
15	28.7	6.98	2.38	0.97	.....	.....	.....	.....	.....	.....	.....	.....
20	50.4	12.3	4.07	1.66	0.42	.....	.....	.....	.....	.....	.....	.....
25	78.0	19.0	6.40	2.62	.....	0.21	0.10	.....	.....	.....	.....	.....
30	.....	27.5	9.15	3.75	0.91	.....	.....	.....	.....	.....	.....	.....
35	.....	37.0	12.04	5.05	.....	.....	.....	.....	.....	.....	.....	.....
40	.....	48.0	16.1	6.52	1.60	.....	.....	.....	.....	.....	.....	.....
45	.....	.....	20.2	8.15	.....	.....	.....	.....	.....	.....	.....	.....
50	.....	.....	24.9	10.0	2.44	0.81	0.35	0.09	.....	.....	.....	.....
75	.....	.....	56.1	22.4	5.32	1.80	0.74	.....	.....	.....	.....	.....
100	.....	.....	.....	39.0	9.46	3.20	1.31	0.33	0.05	.....	.....	.....
125	.....	.....	.....	.....	14.9	4.89	1.99	.....	.....	.....	.....	.....
150	.....	.....	.....	.....	21.2	7.0	2.85	0.69	0.10	.....	.....	.....
175	.....	.....	.....	.....	28.1	9.46	3.85	.....	.....	.....	.....	.....
200	.....	.....	.....	.....	37.5	12.47	5.02	1.22	0.17	.....	.....	.....
250	.....	.....	.....	.....	.....	19.66	7.76	1.89	0.26	0.07	0.03	0.01
300	.....	.....	.....	.....	.....	28.06	11.2	2.66	0.37	0.09	0.04	.....
350	.....	.....	.....	.....	.....	.....	15.2	3.65	0.50	0.12	0.05	0.02
400	.....	.....	.....	.....	.....	.....	19.5	4.73	0.65	0.16	0.06	.....
500	.....	.....	.....	.....	.....	.....	30.8	7.43	0.96	0.25	0.09	0.04
750	.....	.....	.....	.....	.....	.....	.....	.....	2.21	0.53	0.18	0.08

FIRE STREAMS

Pressures required at nozzle and at pump, with quantity and pressure of water necessary to throw water various distances through different-sized nozzles, using 2½-inch rubber hose and smooth nozzles.

G. A. Ellis, C. E.

Size of Nozzles	1-inch				1⅛-inch				1¼-inch				1⅜-inch			
Pressure at nozzle.....	40	60	80	100	40	60	80	100	40	60	80	100	40	60	80	100
* " at pump or hyd. with 100 ft. 2½-in. rubber hose.	48	73	97	121	54	81	108	135	61	92	123	154	71	107	144	180
Gallons per minute.....	155	189	219	245	196	240	277	310	242	297	342	383	293	358	413	462
Horizontal distance thrown.	109	142	168	186	113	148	175	193	118	156	186	207	124	166	200	224
Vertical distance thrown....	79	108	131	148	81	112	137	157	82	115	142	164	85	118	146	169

*For greater lengths of 2½ hose the increased friction can readily be obtained by noting the differences between the above-given "pressure at nozzle" and "pressure at pump or hydrant with 100 feet of hose." For instance, if it requires at hydrant or pump eight pounds more pressure than it does at nozzle to overcome the friction when pumping through 100 feet of 2½-inch hose (using 1-inch nozzle with 40 pounds pressure at said nozzle) then it requires 16 pounds pressure to overcome the friction in forcing through 200 feet of the same size hose.

USEFUL INFORMATION

PER CENT OF SAVING OF FUEL BY HEATING FEED WATER

Steam at 60 Pounds

Final Temperature	Initial Temperature of Water											
	32°	40°	50°	60°	70°	80°	90°	100°	120°	140°	160°	180°
60°	2.39	1.71	.86	.....	.....	.....	.....	.....	.....	.....	.....	.....
80	4.09	3.43	2.59	1.74	.88	.....	.....	.....	.....	.....	.....	.....
100	5.79	5.14	4.32	3.49	2.64	1.77	.90	.....	.....	.....	.....	.....
120	7.50	6.85	6.05	5.23	4.40	3.55	2.86	1.80	.....	.....	.....	.....
140	9.20	8.57	7.77	6.97	6.15	5.32	4.47	3.61	1.84	.....	.....	.....
160	10.90	10.28	9.50	8.72	7.91	7.09	6.26	5.42	3.67	1.87	.....	.....
180	12.60	12.	11.23	10.46	9.68	8.87	8.06	7.23	5.52	3.75	1.91	.....
200	14.30	13.71	13.	12.20	11.43	10.65	9.85	9.03	7.36	5.62	3.82	1.96
220	16.	15.42	14.70	14.	13.19	12.33	11.64	10.84	9.20	7.50	5.73	3.93
240	17.79	17.13	16.42	15.69	14.96	14.20	13.43	12.65	11.05	9.37	7.64	5.90
260	19.40	18.85	18.15	17.44	16.71	15.97	15.22	14.45	11.88	11.24	9.56	7.86

SUGGESTIONS REGARDING CORRESPONDENCE ABOUT PUMPS

In ordering or inquiring about pumps, purchasers should inform us upon the following questions:

For what purpose is the pump to be used?

What is the maximum quantity to be pumped per hour?

To what height is the water to be lifted by suction; the length of suction pipe, size and number of turns?

What is the pressure of steam to be used?

Is the water to be pumped hot or cold?

Inquirers about **Deep Well Pumps** should inform us on the following questions:

Is your well already bored? If so, is it cased, and how? Or, if open well, so state.

What is its depth?

At what height does the water stand in the well, and what is the distance from water to ground level?

How much higher than the surface of the ground do you wish to raise the water?

What is the length of the horizontal pipe from well to tank or reservoir?

What is the greatest quantity, in gallons, of water required per day or hour?

Has your well been tested? If so, how, and what was the result?

ELECTRICAL UNITS

The electric units are as follows:

Volt.—The unit of electrical motive force. Force required to send one ampere of current through one ohm of resistance.

Ohm.—Unit of resistance. The resistance offered to the passage of one ampere, when impelled by one volt.

Ampere.—Unit of current. The current which one volt can send through a resistance of one ohm.

Coulomb.—Unit of quantity. Quantity of current which, impelled by one volt, would pass through one ohm in one second.

Farad.—Unit of capacity. A conductor or condenser which will hold one coulomb under the pressure of one volt.

Joule.—Unit of work. The work done by one watt in one second.

Watt.—The unit of electrical energy, and is the product of the ampere and volt. That is, one ampere of current flowing under a pressure of one volt gives one watt of energy.

One electrical horse power is equal to 746 watts.

One kilowatt is equal to 1000 watts.

To find the watts consumed in a given electrical circuit, such as a lamp, multiply the volts by the amperes.

To find the volts, divide the watts by the amperes.

To find the amperes, divide the watts by the volts.

To find the electrical horse power required by a lamp, divide the watts of the lamp by 746.

To find the number of lamps that can be supplied by one electrical horse power of energy, divide 746 by the watts of the lamp.

To find the electrical horse power necessary, multiply the watts per lamp by the number of lamps and divide by 746.

To find the mechanical horse power necessary to generate the required electrical horse power, divide the latter by the efficiency of the generator.

To find the amperes of a given circuit, of which the volts and ohms resistance are known, divide the volts by the ohms.

To find the volts, when the amperes and watts are known, multiply the amperes by the ohms.

To find the resistance in ohms, when the volts and amperes are known, divide the volts by the amperes.

USEFUL INFORMATION

TABLE SHOWING AMOUNT OF WATER DISCHARGED PER STROKE BY A SINGLE-ACTING PUMP

The Diameter of Cylinder and Length of Stroke being Known. The Diameters of Circles and Cylinders being Identical

Diam. of Pump Cylinder Inches	Capacity per Stroke, Gallons									
	Length of Stroke, Inches									
	1	2	3	4	5	6	7	8	10	12
1	.0034	.0068	.0102	.0136	.0170	.0204	.0238	.0272	.0340	.0408
1¼	.0053	.0106	.0159	.0212	.0266	.0319	.0372	.0425	.0531	.0637
1½	.0076	.0153	.0229	.0306	.0382	.0459	.0535	.0612	.0765	.0918
1¾	.0104	.0208	.0312	.0416	.0521	.0625	.0729	.0833	.1041	.1249
2	.0136	.0272	.0408	.0544	.0680	.0816	.0952	.1088	.1360	.1632
2¼	.0172	.0344	.0516	.0688	.0860	.1033	.1205	.1377	.1721	.2071
2½	.0212	.0425	.0637	.0850	.1062	.1275	.1487	.1700	.2125	.2550
2¾	.0257	.0514	.0771	.1028	.1285	.1543	.1800	.2057	.2571	.3085
3	.0306	.0612	.0918	.1224	.1530	.1836	.2142	.2448	.3060	.3672
3¼	.0359	.0719	.1078	.1438	.1795	.2156	.2515	.2875	.3594	.4313
3½	.0416	.0833	.1249	.1666	.2082	.2499	.2915	.3332	.4165	.4998
3¾	.0479	.0957	.1435	.1914	.2393	.2871	.3350	.3828	.4785	.5743
4	.0544	.1088	.1632	.2176	.2720	.3264	.3808	.4352	.5440	.6528
4½	.0688	.1377	.2065	.2754	.3442	.4131	.4819	.5508	.6885	.8262
5	.0850	.1700	.2550	.3400	.4250	.5100	.5950	.6800	.8500	1.0200
5½	.1028	.2057	.3085	.4114	.5142	.6171	.7199	.8228	1.0285	1.2342
6	.1224	.2448	.3672	.4896	.6120	.7344	.8568	.9792	1.2240	1.4688
7	.1666	.3332	.4998	.6664	.8330	.9996	1.1662	1.3328	1.6660	1.9992
8	.2176	.4352	.6528	.8704	1.0880	1.3056	1.5232	1.7408	2.1760	2.6112
9	.2754	.5508	.8262	1.1016	1.3770	1.6524	1.9278	2.2032	2.7540	3.3048
10	.3400	.6800	1.0200	1.3600	1.7000	2.0400	2.3800	2.7200	3.4000	4.0800
12	.4896	.9792	1.4688	1.9584	2.4480	2.9376	3.4272	3.9168	4.8960	5.8752
15	.7650	1.5300	2.2950	3.0600	3.8250	4.5960	5.3550	6.1200	7.6500	9.1800
18	1.1016	2.2032	3.3048	4.4064	5.5080	6.6096	7.7112	8.8128	11.0160	13.2192
20	1.3600	2.7200	4.0800	5.4400	6.8000	8.1600	9.5200	10.8800	13.6000	16.3200
24	1.9584	3.9168	5.8752	7.8336	9.7920	11.7504	13.7088	15.6672	19.5840	23.5008

The capacities in gallons given in the foregoing table are for single-acting pump, making one complete stroke (or revolution). The capacity of a double-acting pump is double that of a single-acting pump, with the same diameter of cylinder and length of stroke.

STEAM

A cubic inch of water evaporated under atmospheric pressure is converted into one cubic foot of steam (approximately).

The specific gravity of steam at atmospheric pressure is .411, the same as air at 34° Fahr.

1 pound of steam has a volume of 27.222 cubic feet.

1 pound of dry air has a volume of 13.817 cubic feet.

The best boilers, when properly set and fired, will evaporate from 7 to 10 pounds of water per pound of first-class coal.

The steam consumption of engines varies from 14 to 60 pounds of feed water, or from 1½ to 7 pounds of coal per horse power per hour.

For condensers, allow about 25 gallons of cooling water for each gallon of feed water,

USEFUL INFORMATION

Steam

A good automatic non-condensing engine requires from 3 to 4 pounds of coal per horse power per hour, according to the quality of the coal.

An automatic condensing engine requires from 2¼ to 3½ pounds of coal per horse power per hour.

A steam-jacketed compound condensing engine of the most improved construction may reduce the consumption of coal as low as 1¾ to 2 pounds of coal per horse power per hour.

The average amount of feed water required for a good economical engine is 30 pounds per indicated horse power per hour; engines of high economy will use less than this amount, and those more wasteful will use more. A high piston speed, together with a high rotative speed, is very desirable, as great power may thus be obtained from moderate sized engines, and also the evil of internal condensation is corrected to a great extent, but these are somewhat limited by practical considerations.

A good condenser increases the economical efficiency of an engine from 25 to 40 per centum, and the amount of injection water required is about 25 times the quantity fed into the boilers.

TO FIND THE HORSE POWER OF STEAM ENGINES

Multiply the area of the piston in inches by the average steam pressure throughout the stroke, then multiply by the number of feet of piston travel per minute; then divide this product by 33,000, which will give the nominal horse power, when a proper allowance for friction has been deducted.

RULES FOR ESTIMATING POWER OF STEAM BOILERS

First.—Shell Boiler. 10 feet of heating surface will produce one horse power. The heating surface is two thirds the surface of the cylinder, and is obtained by multiplying the length by two thirds of the circumference.

Second.—Flue Boiler. 12 feet of heating surface will produce 1 horse power. The heating surface is two thirds the surface of the cylinder; also the entire surface of all the flues.

Third.—Tubular Boiler. 15 feet of heating surface will produce 1 horse power. The heating surface is two thirds the surface of the cylinder; also the entire surface of all the tubes.

1 nominal horse power will require 1 cubic foot of water per hour. 1 cubic foot of water contains 7½ gallons.

MANAGEMENT AND CARE OF STEAM BOILERS

1. **Condition of Water.**—The first duty of an engineer when he enters his boiler room in the morning, is to ascertain how many gauges of water there are in his boilers. Never unbank or replenish the fires until this is done. Accidents have occurred, and many boilers have been entirely ruined from neglect of this precaution.

2. **Low Water.**—In case of low water, immediately cover the fires with ashes, or, if no ashes are at hand, use fresh coal. Don't turn on the feed under any circumstances, nor tamper with, or open the safety valve. Let the steam outlets remain as they are.

3. **Foaming.**—Close throttle, and keep closed long enough to show true level of water. If that level is sufficiently high, feeding and blowing will usually suffice to correct the evil. In cases of violent foaming, caused by dirty water, or change from salt to fresh, or vice versa, in addition to the action above stated, check draft and cover fires with fresh coal.

4. **Leaks.**—When leaks are discovered they should be repaired as soon as possible.

5. **Blowing Off.**—Blow down, under a pressure not exceeding 20 pounds, at least once in two weeks; every Saturday night would be better. In case the feed becomes muddy, blow out 6 or 8 inches every day. Where surface blow cocks are used, they should be often opened for a few moments at a time.

6. **Filling the Boiler.**—After blowing down allow the boiler to become cool before filling again. Cold water pumped into hot boilers is very injurious from sudden contraction.

7. **Exterior of Boiler.**—Care should be taken that no water comes in contact with the exterior of the boiler, either from leaky joints or other causes.

8. **Removing Deposit and Sediment.**—In tubular boilers the hand hole should be often opened, and all collections removed from over the fire. Also, when boilers are fed in front, and blown off through the same pipe, the collection of mud or sediment in the rear end should be often removed.

9. **Safety Valves.**—Raise the safety valves cautiously and frequently, as they are liable to become fast in their seats, and useless for the purpose intended. Should the gauge at any time indicate the limit of pressure allowed, see that the safety valves are blowing off.

10. **Gauge Cocks.—Glass Gauge.**—Keep gauge cocks clear and in constant use. Glass gauges should not be relied upon altogether.

11. **Blisters.**—When a blister appears there must be no delay in having it carefully examined, and trimmed or patched, as the case may require.

12. **Clean Sheets.**—Particular care should be taken to keep sheets and parts of boiler exposed to the fire perfectly clean; also all tubes, flues, and connections well swept. This is particularly necessary where wood or soft coal is used for fuel.

13. **General Care of Boilers and Connections.**—Under all circumstances keep the gauges, cocks, etc., clean and in good order, and things generally in and about the engine and boiler room in a neat condition.

EFFECTIVE PRESSURE OF STEAM ON PISTON

With different rates of expansion, boiler pressure 100 pounds.

Steam	cut-off	at	¾	stroke	=90	pounds	effective	pressure.
"	"	"	⅔	"	=80	"	"	"
"	"	"	½	"	=69	"	"	"
"	"	"	⅓	"	=50	"	"	"
"	"	"	¼	"	=40	"	"	"

USEFUL INFORMATION

TABLE SHOWING SAFE WORKING STEAM PRESSURE FOR IRON BOILERS OF DIFFERENT SIZES, USING A FACTOR OF SAFETY OF SIX

Internal Diameter of Shell in Inches	Thickness of Iron Inches	Longitudinal Seams, Single Riveted — Tensile Strength of Iron			Longitudinal Seams, Double Riveted — Tensile Strength of Iron		
		45000 Lbs. Pressure Pounds	50000 Lbs. Pressure Pounds	55000 Lbs. Pressure Pounds	45000 Lbs. Pressure Pounds	50000 Lbs. Pressure Pounds	55000 Lbs. Pressure Pounds
36	1/4	104	116	127	125	139	152
	5/16	130	145	159	156	174	191
38	1/4	99	110	121	119	132	145
	5/16	123	137	151	148	164	181
40	1/4	94	104	115	113	125	138
	5/16	117	130	143	140	156	172
42	1/4	89	99	109	107	119	131
	5/16	112	124	136	134	149	163
44	1/4	85	95	104	102	184	125
	5/16	107	118	130	128	142	156
46	1/4	82	91	100	98	109	120
	5/16	102	113	125	122	136	150
48	1/4	78	87	96	94	104	115
	5/16	98	109	120	118	131	144
	3/8	118	131	144	142	157	173
50	1/4	75	83	92	90	100	110
	5/16	94	104	115	113	125	138
	3/8	112	125	138	131	150	166
52	1/4	72	80	88	86	96	106
	5/16	90	100	110	108	120	132
	3/8	108	120	132	130	144	158
54	5/16	87	96	106	101	112	122
	3/8	104	116	127	120	134	148
	7/16	121	135	148	140	156	172
60	5/16	78	87	95	94	104	114
	3/8	94	104	115	113	125	138
	7/16	109	121	134	131	145	160
66	3/8	85	95	104	102	114	125
	7/16	99	111	121	120	133	146
	1/2	112	117	138	137	152	167
72	3/8	78	87	96	94	105	115
	7/16	91	102	112	110	122	134
	1/2	102	117	128	125	140	153

CYLINDRICAL FLUE BOILERS

Each nominal horse power requires:
1 cubic yard capacity.
1 square yard of heating surface.
1 square foot of fire grate surface.
1 cubic foot of water per hour.
28 square inches flue area.
G = Fire grate surface in square feet.
H = Nominal horse power.
S = Heating surface in square yards.

$$\sqrt{SG}=H. \quad \frac{H^2}{G}=S. \quad \frac{H^2}{S}=G.$$

TUBULAR BOILERS

Each nominal horse power requires:
8 cubic feet total boiler capacity.
2 cubic feet steam room.
10 square feet of heating surface—the whole tube surface being taken as effective.
½ square foot of fire grate surface.
1 cubic foot of water per hour.
10 square inches sectional area of tubes.
13 square inches flue area.
6 square inches chimney area.
Diameter of tubes 1/30 of their length.

For cylindrical two-flued boilers an approximate rule is, length × diam. ÷ 6 = nominal horse power.

AREA OF CHIMNEYS

Q = Quantity of coal consumed per hour in pounds.
H = Height of chimney in feet.
P = Indicated horse power.
A = Area of chimney at top in square inches.

$$A=\frac{15Q}{\sqrt{H}}=\frac{150P}{H}$$

The area for entrance of air to ash pit should be ¼ the area of grate. 2 feet 6 inches is sufficient depth.

The grate bars inclining downward 1 inch per foot, not more than ¾ inch thick, and ⅜ to ½-inch spaces between.

The furnace should have 3 cubic feet of space above each superficial foot of grate bar surface.

USEFUL INFORMATION

FIGURES AND FORMULAS

The areas of circles are to each other as the squares of their respective diameters. In other words, doubling the diameter of a pipe or cylinder increases its capacity (area of circle) four times.

Every foot of height in a column of water represents .434 pounds pressure to the square inch; in common practice, however, it is estimated that every foot in height represents ½ pound pressure to the square inch.

A cubic inch of water weighs .03617 pounds.
A cubic foot of water weighs 62.46 pounds.
A gallon of water weighs 8.355 pounds.
A gallon of water contains 231 cubic inches.
A cubic foot of water contains 1728 cubic inches.
A cubic foot of water contains 7.4805 gallons.

STEAM

A cubic inch of water evaporated under atmospheric pressure is converted into 1 cubic foot of steam (approximately).

The specific gravity of steam at atmospheric pressure is .411, the same as air at 34° F.

1 pound of steam has a volume of 27.222 cubic feet.

1 pound of dry air has a volume of 13.817 cubic feet.

The best boilers, when properly set and fired, will evaporate from 7 to 10 pounds of water per pound of first-class coal.

The steam consumption of engines varies from 14 to 60 pounds of feed water, or from 1½ to 7 pounds of coal per horse power per hour.

For condensers, allow about 25 gallons of cooling water for each gallon of feed water.

FUEL

1 pound of coal will evaporate from 7 to 10 pounds of water.
1 pound of dry pine wood will evaporate from 4 to 5 pounds of water.
1 ton of anthracite coal requires a space of 42 cubic feet.
1 ton of bituminous coal requires a space of 44 cubic feet.
1 ton of coke requires a space of 80 cubic feet.
150.35 cubic feet of air are required for the combustion of 1 pound of coal.

MISCELLANEOUS

To find circumference of a circle multiply diameter by 3.1416.
To find diameter of a circle multiply circumference by .31831.
To find area of a circle multiply square of diameter by .7854.
To find side of an equal square multiply diameter by .8862.
Doubling the diameter of a pipe increases its capacity four times.
A gallon of water (U. S. standard) weighs 8⅛ pounds and contains 231 cubic inches.
A cubic foot of water contains 7½ gallons, 1,728 cubic inches, and weighs 62½ pounds.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 pounds to the square inch).

A standard boiler horse power: The evaporation of 30 pounds of water per hour from a feed water temperature of 100° F. into steam at 70 pounds gauge pressure.

To ascertain heating surface in tubular boilers multiply two thirds the circumference of boiler by length of boiler in inches, and add to it the area of all the tubes.

One sixth of tensile strength of plate multiplied by thickness of plate and divided by one half the diameter of boiler gives safe working pressure for tubular boilers. For marine boilers add 20 per cent for drilled holes.

To find approximate weight of iron for round bars multiply the square of the diameter in inches by the length in feet, and that product by 26. The product will be the weight in pounds, nearly.

To find the approximate weight of iron for square and flat bars multiply the area of the end of the bar in inches by the length in feet, and then by 3.32. The product will be the weight in pounds, nearly.

USEFUL INFORMATION

FIGURES AND FORMULAS

The areas of circles are to each other as the squares of their respective diameters. In other words, doubling the diameter of a pipe or cylinder increases its capacity (area of circle) four times.

Every foot of height in a column of water represents .434 pounds pressure to the square inch; in common practice, however, it is estimated that every foot in height represents ½ pound pressure to the square inch.

A cubic inch of water weighs .03617 pounds.
A cubic foot of water weighs 62.46 pounds.
A gallon of water weighs 8.355 pounds.
A gallon of water contains 231 cubic inches.
A cubic foot of water contains 1728 cubic inches.
A cubic foot of water contains 7.4805 gallons.

VALUABLE FORMULAS

From the foregoing rules and equivalents may be deduced the following *Concise Formulas* for computing the capacity, required power and speed of pumps.

LET

D = Diameter of pump cylinder in inches.
S = Length of stroke in inches.
N = Number of strokes per minute.
Q = Quantity of water raised per minute in gallons.
H = Height in feet water is elevated from surface; or height of a column of water.

THEN

$D^2 \times .7854$ = The area of a circle (of cylinder) of a given diameter.

$D^2 S \times .7854$ = Capacity of pump per stroke in cubic inches.

$\frac{D^2 S \times .7854}{231}$ = Capacity of pump per stroke in gallons.

$\frac{D^2 S \times .7854}{1728}$ = Capacity of pump per stroke in cubic feet.

$\frac{D^2 S \times .7854 \times 8.355}{231}$ = Capacity of pump per stroke in pounds of water.

$D^2 S \times .7854 N$ = Capacity of pump per minute in cubic inches.

$\frac{D^2 S \times .7854 N}{231}$ = Capacity of pump per minute in gallons (=) Q.

$\frac{D^2 S \times .7854 N}{1728}$ = Capacity of pump per minute in cubic feet.

$\frac{Q. H \times 8.355}{33000}$ = Horse power required to elevate a given quantity of water per minute to certain height.

$H \times .434$ = Pounds pressure (per square inch) of a column of water.

$D^2 \times .7854 \times (H \times .434)$ = Pounds pressure at a point in a pipe or cylinder, "H" being the vertical distance (in feet) to surface of water from said point and "D" the diameter of cylinder or pipe (in inches) at said point.

$\left| \frac{Q}{\frac{D^2 S \times .7854}{231}} \right| = \frac{Q}{D^2 S \times .0034}$ Number of strokes per minute necessary to raise a given quantity of water in gallons.

USEFUL INFORMATION

COPYRIGHTED BY SULLIVAN MACHINERY CO.

LOSS OF AIR PRESSURE IN PIPES, DUE TO FRICTION; APPLIES TO ALL PRESSURES AND FOR VOLUMES UP TO 3000 CUBIC FEET OF FREE AIR

Divide the number corresponding to the diameter of the pipe and volume in cubic feet of free air by the ratio of compressions from free air. The result is the loss in pounds per square inch in 1000 feet of pipe. *See example.

Cubic Feet of Free Air per Minute	Diameter of Pipe in Inches								
	½	¾	1	1¼	1½	2	2½	3	3½
6	43.5	5.7	1.4	.4	....	....	....	....	....
12	173.	22.8	5.3	1.5	....	....	....	....	....
24	753.	91.	21.	5.9	2.2	....	....	....	....
48	....	362.	85.	23.5	8.5	2.	....	....	....
75	....	....	200.	57.	21.	4.9	1.6	....	....
100	....	....	373.	92.	37.5	8.7	2.7	....	....
125	....	....	....	163.	59.	13.6	4.4	....	....
150	....	....	....	230.	83.5	19.5	6.3	2.3	....
200	....	....	....	368.	150.	35.	10.8	3.7	....
250	....	....	....	....	216.	54.5	17.7	6.4	2.9
300	....	....	....	....	338.	79.	25.3	9.3	4.2
	2	2½	3	3½	4	4½	5	6	7
350	105.	33.	12.7	5.5	2.7	....	....	....	....
400	140.	45.	14.8	7.1	3.6	1.9	....	....	....
450	174.	55.	20.7	9.4	4.1	2.3	....	....	....
500	216.	68.	26.	11.1	5.6	2.9	1.7	....	....
600	316.	100.	37.	16.6	7.3	4.	2.5	....	....
700	....	133.	51.	21.8	10.9	5.8	3.4	....	....
800	....	172.	59.	29.	14.3	7.5	4.4	1.8	....
900	....	219.	83.	38.	16.5	9.2	5.4	2.2	....
1000	....	272.	104.	44.	22.	11.7	6.8	2.8	1.4
1200	....	400.	148.	67.	29.	16.	9.6	3.9	1.9
1400	....	....	204.	87.	44.	23.	14.	5.5	2.6
1600	....	....	236.	114.	57.	30.	18.	7.1	3.1
1800	....	....	332.	150.	66.	35.	22.	8.8	4.3
2100	....	....	....	196.	98.	52.	30.	12.5	5.9
2400	....	....	....	266.	117.	65.	38.	15.5	7.7
2700	....	....	....	....	149.	82.	49.	19.5	9.8
3000	....	....	....	....	201.	100.	60.	24.	12.

*Example:

What is the loss of pressure and the terminal pressure with 350 cubic feet of free air compressed to 90 pounds? Initial gauge pressure passing through 500 feet of 2-inch pipe. From the table it will be seen that the number corresponding to the diameter of pipe and the volume mentioned is 105.

$$\frac{90 + 14.7}{14.7} = 7.1 \text{ atmospheres or compressions.}$$

$$\frac{1000'}{500'} = 2 \quad \frac{105.}{2} = 52.5 \qquad \frac{52.5}{7.1} = 7.4 \text{ pounds loss.}$$

90 pounds Initial − 7.4 pounds loss = 82.6 pounds terminal pressure.

This table is adapted from Elmo G. Harris' Formula in compressed air. McGraw-Hill Book Co., 1910.

$$f = c\frac{l}{d^5} \times \frac{(Va)^2}{r}$$

f = Loss of pressure per square inch.
c = An experimental coefficient.
l = Length of pipe in feet.
d = Diameter of pipe in inches.
Va = Cubic feet free air passing per second.
r = Ratio of compressions from free air.

VALUES FOR C USED

d = inch	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7
c =	1.47	1.21	1.35	1.16	1.02	1	.95	.9	.86	.825	.775	.715	.825	.8

USEFUL INFORMATION

COPYRIGHTED BY SULLIVAN MACHINERY CO.

TABLE III

AIR COMPRESSION AT AN ALTITUDE

HORSE POWER PER 100 CUBIC FEET FREE AIR PER MINUTE, TWO-STAGE COMPRESSION; THEORETICAL HORSE POWER IN AIR CYLINDERS

ALLOW FOR FRICTION AND OTHER LOSSES

Altitude in Feet	Barom. Pressure Lbs. per Sq. in.	Terminal Gauge Pressure 70	75	80	85	90	95	100	110	120	130	140	150
Sea Level	14.72	12.84	13.32	13.78	14.21	14.63	15.03	15.42	16.15	16.83	17.47	18.07	18.64
1000	14.17	12.62	13.08	13.52	13.95	14.35	14.74	15.12	15.83	16.49	17.11	17.69	18.25
2000	13.64	12.39	12.84	13.27	13.68	14.08	14.46	14.82	15.51	16.15	16.76	17.33	17.86
3000	13.13	12.17	12.61	13.03	13.43	13.81	14.18	14.53	15.20	15.83	16.41	16.96	17.48
4000	12.64	11.94	12.37	12.78	13.17	13.54	13.90	14.25	14.90	15.50	16.07	16.61	17.11
5000	12.17	11.72	12.14	12.54	12.92	13.28	13.63	13.96	14.60	15.19	15.74	16.25	16.75
6000	11.71	11.51	11.91	12.30	12.66	13.02	13.35	13.68	14.29	14.86	15.40	15.90	16.38
7000	11.27	11.29	11.68	12.06	12.41	12.76	13.09	13.40	14.00	14.55	15.07	15.56	16.02
8000	10.85	11.07	11.46	11.83	12.17	12.50	12.82	13.13	13.71	14.25	14.75	15.22	15.67
9000	10.45	10.87	11.24	11.59	11.93	12.26	12.57	12.86	13.42	13.95	14.44	14.90	15.33
10000	10.06	10.66	11.02	11.37	11.69	12.01	12.31	12.60	13.14	13.65	14.12	14.57	14.99
11000	9.69	10.46	10.81	11.14	11.46	11.76	12.06	12.34	12.87	13.36	13.82	14.26	14.67
12000	9.33	10.25	10.59	10.92	11.22	11.52	11.81	12.08	12.60	13.07	13.52	13.94	14.34
13000	8.98	10.05	10.38	10.70	11.00	11.28	11.56	11.83	12.32	12.79	13.23	13.63	14.02
14000	8.64	9.85	10.17	10.48	10.77	11.05	11.31	11.57	12.06	12.51	12.92	13.32	13.70
15000	8.32	9.65	9.97	10.26	10.55	10.82	11.08	11.33	11.79	12.23	12.64	13.03	13.39

TABLE IV

HORSE POWER PER 100 CUBIC FEET FREE AIR PER MINUTE, SINGLE STAGE COMPRESSION THEORETICAL HORSE POWER IN AIR CYLINDERS

TERMINAL GAUGE PRESSURE

Altitude	Bar	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Sea Level	14.72	1.97	3.61	5.02	6.28	7.44	8.45	9.41	10.30	11.13	11.92	12.67	13.37	14.05	14.70	15.32
1000	14.17	1.97	3.59	4.99	6.23	7.35	8.36	9.31	10.18	10.99	11.77	12.50	13.18	13.85	14.49	15.09
2000	13.64	1.96	3.57	4.95	6.18	7.26	8.27	9.20	10.05	10.85	11.61	12.33	12.99	13.64	14.26	14.86
3000	13.13	1.95	3.55	4.91	6.11	7.18	8.18	9.08	9.92	10.71	11.45	12.15	12.81	13.43	14.05	14.62
4000	12.64	1.94	3.52	4.87	6.05	7.10	8.09	8.96	9.79	10.56	11.29	11.97	12.62	13.23	13.83	14.40
5000	12.17	1.93	3.49	4.82	5.99	7.02	7.99	8.85	9.65	10.41	11.13	11.79	12.43	13.03	13.61	14.16
6000	11.71	1.92	3.46	4.78	5.93	6.95	7.90	8.74	9.52	10.26	10.97	11.61	12.25	12.83	13.39	13.92
7000	11.27	1.91	3.44	4.73	5.86	6.87	7.79	8.63	9.40	10.12	10.80	11.44	12.05	12.63	13.18	13.69
8000	10.85	1.90	3.42	4.69	5.8	6.79	7.69	8.51	9.27	9.97	10.64	11.26	11.85	12.43	12.95	13.48
9000	10.45	1.89	3.40	4.64	5.74	6.72	7.59	8.40	9.14	9.84	10.48	11.08	11.67	12.23	12.74	13.25
10000	10.06	1.88	3.37	4.61	5.68	6.64	7.49	7.29	9.01	9.69	10.32	10.91	11.49	12.03	12.54	13.03
11000	9.69	1.87	3.34	4.57	5.62	6.56	7.39	8.17	8.88	9.55	10.17	10.75	11.30	11.83	12.33	12.81
12000	9.33	1.87	3.31	4.52	5.56	6.47	7.29	8.05	8.76	9.40	10.01	10.59	11.12	11.64	12.13	12.60
13000	8.98	1.86	3.28	4.48	5.49	6.39	7.20	7.94	8.63	9.26	9.85	10.42	10.95	11.44	11.93	12.38
14000	8.64	1.85	3.26	4.43	5.43	6.31	7.10	7.83	8.50	9.12	9.69	10.25	10.76	11.25	11.72	12.17
15000	8.32	1.84	3.25	4.38	5.36	6.22	7.00	7.72	8.36	8.97	9.53	10.07	10.57	11.06	11.51	11.95

The decreased power required by a compressor due to elevation varies from 60 to 56 per cent of the loss of capacity.

From the table (2) shown, the loss in capacity of a compressor may be determined for any altitude. Example: assume a compressor discharging air at 100 pounds pressure, and having a piston displacement at ocean level of 558 cubic feet per minute; relative capacity of compressor at 8,000 feet altitude, 76 per cent; piston displacement at 8,000 feet equals 558x.76 equals 424.08 cubic feet.

EXAMPLE FOR TABLE I

What compressor capacity will be required to operate five 3-inch drills at 6,000 feet elevation with 85 pounds pressure?

The amount of free air for five 3-inch drills at 90 pounds pressure is 514 cubic feet. In above table, under 85 pounds and opposite 6,000, is found 1.16; 514x1.16=596 cubic feet, required compressor capacity.

USEFUL INFORMATION

TABLE I

FACTORS OF MULTIPLICATION FOR VARIOUS ALTITUDES AND PRESSURES, ETC.

FOR USE IN COMPUTING SIZE OF AIR COMPRESSORS, ETC.

COPYRIGHTED BY SULLIVAN MACHINERY CO.

Altitude in Feet	Air Pressure at Machine, Pounds											
	60	65	70	75	80	85	90	95	100	110	120	130
Sea Level	.71	.76	.81	.86	.90	.95	1.00	1.05	1.10	1.19	1.29	1.38
1000	.74	.79	.83	.88	.93	.98	1.03	1.08	1.13	1.23	1.33	1.43
2000	.76	.81	.86	.91	.96	1.02	1.07	1.12	1.17	1.27	1.38	1.48
3000	.78	.84	.89	.94	1.00	1.05	1.10	1.16	1.21	1.32	1.43	1.53
4000	.81	.86	.92	.97	1.03	1.08	1.14	1.20	1.25	1.36	1.47	1.59
5000	.83	.89	.95	1.01	1.06	1.12	1.18	1.24	1.30	1.41	1.53	1.64
6000	.86	.92	.98	1.04	1.10	1.16	1.22	1.28	1.31	1.46	1.58	1.70
7000	.89	.95	1.01	1.08	1.14	1.20	1.26	1.33	1.39	1.51	1.64	1.76
8000	.92	.98	1.05	1.11	1.18	1.24	1.31	1.37	1.44	1.57	1.70	1.83
9000	.95	1.02	1.08	1.15	1.22	1.28	1.35	1.42	1.49	1.62	1.75	1.89
10000	.98	1.05	1.12	1.19	1.26	1.33	1.40	1.47	1.54	1.68	1.82	1.96
11000	1.01	1.08	1.16	1.23	1.30	1.37	1.45	1.52	1.59	1.74	1.88	2.03
12000	1.04	1.12	1.20	1.27	1.35	1.42	1.50	1.58	1.65	1.80	1.95	2.10
13000	1.08	1.16	1.24	1.31	1.39	1.47	1.55	1.63	1.71	1.86	2.02	2.18
14000	1.12	1.20	1.28	1.36	1.44	1.52	1.61	1.69	1.77	1.93	2.09	2.26
15000	1.15	1.24	1.32	1.41	1.49	1.57	1.66	1.75	1.83	2.00	2.17	2.34

TABLE II

AIR COMPRESSION AT AN ALTITUDE

VOLUMETRIC AND HORSE POWER COEFFICIENTS FOR TWO-STAGE AIR COMPRESSION

COPYRIGHTED BY SULLIVAN MACHINERY CO.

Altitude in Feet	Barom. Press. in Pounds per Sq. Inches	Terminal Gauge Pressure, Pounds per Square Inch													
		70		80		90		100		120		140		150	
		H. P. Coeff.	Volum. Coeff.	H. P. Coeff.	Volum. Coeff.	H. P. Coeff.	Volum. Coeff.	H. P. Coeff.	Volum. Coeff.	H. P. Coeff.	Volum. Coeff.	H. P. Coeff.	Volum. Coeff.	H. P. Coeff.	Volum. Coeff.
Sea Level	14.72	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1000	14.17	.98	.97	.98	.97	.98	.97	.98	.97	.98	.97	.98	.97	.98	.97
2000	13.64	.97	.94	.96	.94	.96	.94	.96	.94	.96	.93	.96	.93	.96	.93
3000	13.13	.95	.91	.95	.91	.94	.91	.94	.91	.94	.90	.94	.90	.94	.90
4000	12.64	.93	.88	.93	.88	.93	.88	.92	.88	.92	.87	.92	.87	.92	.87
5000	12.17	.91	.85	.91	.85	.91	.85	.91	.85	.90	.84	.90	.84	.90	.84
6000	11.71	.90	.82	.89	.82	.89	.82	.89	.82	.88	.82	.88	.81	.88	.81
7000	11.27	.88	.80	.88	.79	.87	.79	.87	.79	.86	.79	.86	.78	.86	.78
8000	10.85	.86	.77	.86	.77	.85	.77	.85	.76	.85	.76	.84	.76	.84	.76
9000	10.45	.85	.75	.84	.74	.84	.74	.83	.74	.83	.73	.82	.73	.82	.73
10000	10.06	.83	.72	.83	.72	.82	.72	.82	.71	.81	.71	.81	.71	.80	.70
11000	9.69	.82	.70	.81	.70	.80	.69	.80	.69	.79	.68	.79	.68	.79	.68
12000	9.33	.80	.68	.79	.67	.79	.67	.78	.67	.78	.66	.77	.66	.77	.66
13000	8.98	.78	.65	.78	.65	.77	.65	.77	.64	.76	.64	.75	.63	.75	.63
14000	8.64	.77	.63	.76	.63	.76	.62	.75	.62	.74	.62	.74	.61	.74	.61
15000	8.32	.75	.61	.74	.61	.74	.60	.74	.60	.73	.59	.72	.59	.72	.59

USEFUL INFORMATION

VOLUME OF AIR AND PRESSURE REQUIRED TO DRIVE DIRECT-ACTING STEAM PUMPS

FROM HISCOX'S "COMPRESSED AIR"

Head of Water in Feet	Gauge Pressure in Pounds per Square Inch — Ratio of Cylinder Diameters							Cubic Feet of Free Air per Minute to Lift One Gallon of Water — Ratio of Cylinder Diameters						
	1 to 1	1¼ to 1	1½ to 1	1¾ to 1	2 to 1	2½ to 1	3 to 1	1 to 1	1¼ to 1	1½ to 1	1¾ to 1	2 to 1	2½ to 1	3 to 1
10	6	...	...	...	...	..	..	.22	....	....	....	....	....	....
20	11	7	...	...	...	..	..	.28	.37	....	....	....	....	....
30	16	10	7	...	...	..	..	.33	.42	.53	....	....	....	....
40	21	13	9	7	...	..	..	.38	.47	.58	.72	....	....	....
50	26	17	12	9	7	..	..	.44	.53	.65	.79	.94	....	....
60	31	20	14	10	8	..	..	.49	.58	.70	.82	.99	....	....
70	36	23	16	12	9	..	..	.54	.63	.75	.88	1.03	....	....
80	42	26	18	14	11	..	..	.61	.68	.79	.95	1.11	....	....
90	47	30	21	15	12	..	..	.66	.75	.87	.98	1.15	....	....
100	52	34	23	17	13	..	..	.72	.82	.91	1.05	1.20	....	....
125	65	42	29	21	16	10	..	.86	.95	1.06	1.18	1.33	1.67	....
150	78	50	35	25	20	13	9	1.00	1.08	1.20	1.31	1.50	1.88	2.31
175	90	58	40	30	23	15	10	1.12	1.22	1.32	1.47	1.63	2.00	2.40
200	105	67	46	34	26	17	12	1.28	1.37	1.47	1.60	1.75	2.14	2.60
250	...	83	58	42	33	21	15	....	1.64	1.75	1.86	2.06	2.41	2.89
300	...	100	68	50	39	25	17	....	1.92	2.00	2.12	2.31	2.68	3.08
350	...	...	80	58	45	29	20	....	....	2.28	2.39	2.57	2.95	3.37
400	...	...	92	67	52	33	23	....	....	2.57	2.68	2.87	3.22	3.66
450	...	...	105	75	58	37	26	....	....	2.88	2.94	3.13	3.48	3.95
500	...	...	...	85	65	42	29	....	....	....	3.27	3.42	3.82	4.24
600	...	...	...	100	78	50	35	....	....	....	3.76	4.00	4.35	4.80
700	...	...	...	...	92	60	42	....	....	....	....	4.58	5.00	5.50
800	...	...	...	...	105	67	47	....	....	....	....	5.15	5.50	5.96
900	...	...	...	...	...	75	52	....	....	....	....	....	6.00	6.45
1000	...	...	...	...	...	85	58	....	....	....	....	....	6.70	7.00

To find the quantity of free air required per minute, in a direct-acting steam pump, to raise a given number of gallons of water through a given head, divide the diameter of the air cylinder by the diameter of the water cylinder, and under the heading of this ratio in above table, and to the right of the given head or lift, find the cubic feet of free air per gallon required per minute; this constant, multiplied by the total number of gallons to be lifted, will give the quantity of free air required. The gauge pressure for the corresponding conditions may be found in a similar manner under the heading of gauge pressures.

In the foregoing table of pressures an allowance of 15 per cent has been made for pump friction, and in the table of volumes 15 per cent has also been allowed for clearance losses and leakage. If the air is reheated before admission to air cylinder, the quantity may be reduced in proportion to the ratio of absolute temperatures. For compound pumps the consumption may be assumed at 75 per cent of the best results of the above table.

USEFUL INFORMATION

AIR CONSUMPTION OF HOISTING ENGINES

(FROM HISCOX'S "COMPRESSED AIR")

The following table is intended to give an approximate idea of the volume of free air required for operating hoisting engines, the air being delivered to the engines at 60 pounds gauge pressure. There are so many variable conditions in the operation of hoisting engines in common use that accurate computations can only be offered when fixed data are given. In the table, the hoisting engine is assumed to actually run but one-half of the time for hoisting, while the compressor, of course, runs continuously. If the engine runs less than one-half the time, as it usually does, the volume of air required will be proportionately less, and vice versa. The table is computed for maximum loads, which also in practice may vary widely. From the intermittent character of the work of a hoisting engine the parts are able to resume their normal temperature between the hoists, and there is little probability of the annoyance of freezing up the exhaust passages.

TABLE OF THE VOLUME OF FREE AIR REQUIRED FOR OPERATING HOISTING ENGINES

THE AIR COMPRESSED TO 60 POUNDS GAUGE PRESSURE

Diam. of Cylinder Inches	Stroke Inches	Rev. per Minute	Nominal Horse Power		Actual Horse Power		Weight Lifted Single Rope		Cu. Ft. Air Required	
			Single	Double	Single	Double	Single	Double	Single	Double
5	6	200	3	6	5.9	11.8	600	1000	75	150
5	8	160	4	8	6.3	12.6	1000	1650	80	160
6¼	8	160	6	12	9.9	19.8	1500	2500	125	250
7	10	125	10	20	12.1	24.2	2000	3500	151	302
8¼	10	125	15	30	16.8	33.6	3000	6000	170	340
8½	12	110	20	40	18.9	37.8	5000	8000	238	476
10	12	110	25	50	26.2	52.4	6000	10000	330	660
12¼	15	100	..	75	....	89.2	....	.....	...	1125
14	18	90	..	100	....	125.	....	.....	...	1587

HORSE POWER (THEORETICAL) REQUIRED TO COMPRESS 100 CU. FT. FREE AIR TO VARIOUS PRESSURES

Gauge Pressure	Single-stage	Two-stage	Saving of Two-stage Over Single-stage H. P.	Saving of Two-stage Over Single-stage Per Cent	Gauge Pressure	Single-stage	Two-stage	Saving of Two-stage Over Single-stage H. P.	Saving of Two-stage Over Single-stage Per Cent
5	1.97	.....	....	.....	130	20.90	17.46	3.43	16.42
10	3.61	.....	....	.....	140	21.74	18.07	3.67	16.89
15	5.02	.....	....	.....	150	22.55	18.64	3.91	17.33
20	6.28	.....	....	.....	160	23.32	19.26	4.06	17.40
25	7.44	.....	....	.....	170	24.06	19.78	4.29	17.80
30	8.45	.....	....	.....	180	24.77	20.27	4.51	18.18
35	9.41	.....	....	.....	190	25.46	20.74	4.70	18.46
40	10.30	.....	....	.....	200	26.12	21.19	4.93	18.88
45	11.13	.....	....	.....	210	.....	21.54	....	.....
50	11.92	10.65	1.28	10.70	220	.....	21.96	....	.....
55	12.67	11.25	1.42	11.22	230	.....	22.37	....	.....
60	13.37	11.81	1.57	11.72	240	.....	22.76	....	.....
65	14.05	12.34	1.71	12.18	250	.....	23.03	....	.....
70	14.70	12.84	1.85	12.61	260	.....	23.28	....	.....
75	15.32	13.32	2.00	13.04	270	.....	23.84	....	.....
80	15.91	13.77	2.13	13.40	280	.....	24.19	....	.....
85	16.48	14.21	2.27	13.77	290	.....	24.53	....	.....
90	17.04	14.63	2.41	14.12	300	.....	24.85	....	.....
95	17.57	15.03	2.54	14.45	350	.....	26.35	....	.....
100	18.09	15.42	2.67	14.77	400	.....	27.65	....	.....
110	19.08	16.15	2.93	15.36	450	.....	28.85	....	.....
120	20.01	16.83	3.18	15.90	500	.....	29.97	....	.....

USEFUL INFORMATION

IRRIGATING

We publish here a table showing results of the Government tests on the quantity of water required for irrigation; local conditions of course vary and this table has been compiled from a comparison of various sections.

ACRES IRRIGATED BY VARIOUS QUANTITIES OF WATER

Showing the number of acres irrigated in 1, 10 and 24 hours, pumping various quantities, and irrigating various depths.

Gallons Pumped per Min.	1 Inch Deep	2 Inches Deep	3 Inches Deep	4 Inches Deep	5 Inches Deep	6 Inches Deep
	Acres Irrigated in 1 Hour					
600	1.3	.6	.4	.3	.2	.2
824	1.8	.9	.6	.4	.3	.3
944	2.1	1.0	.7	.5	.4	.3
988	2.2	1.1	.7	.5	.4	.3
1000	2.2	1.1	.7	.5	.4	.3
1200	2.6	1.3	.9	.6	.5	.4
1500	3.3	1.6	1.1	.8	.6	.5
2000	4.4	2.2	1.4	1.1	.9	.7
	Acres Irrigated in 10 Hours					
600	13.2	6.6	4.4	3.3	2.6	2.2
824	18.2	9.1	6.0	4.5	3.6	3.0
944	20.8	10.4	6.9	5.2	4.1	3.4
988	21.8	10.9	7.2	5.4	4.3	3.6
1000	22.1	11.0	7.3	5.5	4.4	3.7
1200	26.5	13.2	8.8	6.6	5.3	4.4
1500	33.1	16.5	11.0	8.2	6.6	5.5
2000	44.2	22.1	14.7	11.0	8.8	7.3
	Acres Irrigated in 24 Hours					
600	31.8	15.9	10.6	7.9	6.3	5.3
824	43.7	21.8	14.5	10.9	8.7	7.3
944	50.0	25.0	16.7	12.5	10.0	8.3
988	52.4	26.2	17.4	13.1	10.4	8.7
1000	53.0	26.5	17.6	13.2	10.6	8.8
1200	63.6	31.8	21.2	15.9	12.7	10.6
1500	79.5	39.7	26.5	19.9	15.9	13.2
2000	106.0	53.0	35.3	20.5	21.2	17.6

RULES FOR CALCULATING SIZE AND SPEED OF PULLEYS

TO FIND DIAMETER OF DRIVER — Multiply number of revolutions of driven by its diameter and divide product by number of revolutions of driver.

TO FIND DIAMETER OF DRIVEN — Multiply number of revolutions of driver by its diameter and divide product by number of revolutions of driven.

TO FIND REVOLUTIONS OF DRIVEN SHAFT — Multiply diameter of pulley on drive shaft by its number of revolutions and divide product by diameter of pulley on driven shaft.

Reverse above rule to ascertain number of revolutions of drive shaft.

System of figure numbering used in this catalogue patented June 11, 1912

Compiled, printed and bound by
R. R. Donnelley & Sons Company
Plymouth Court, Chicago, Illinois

To 72712